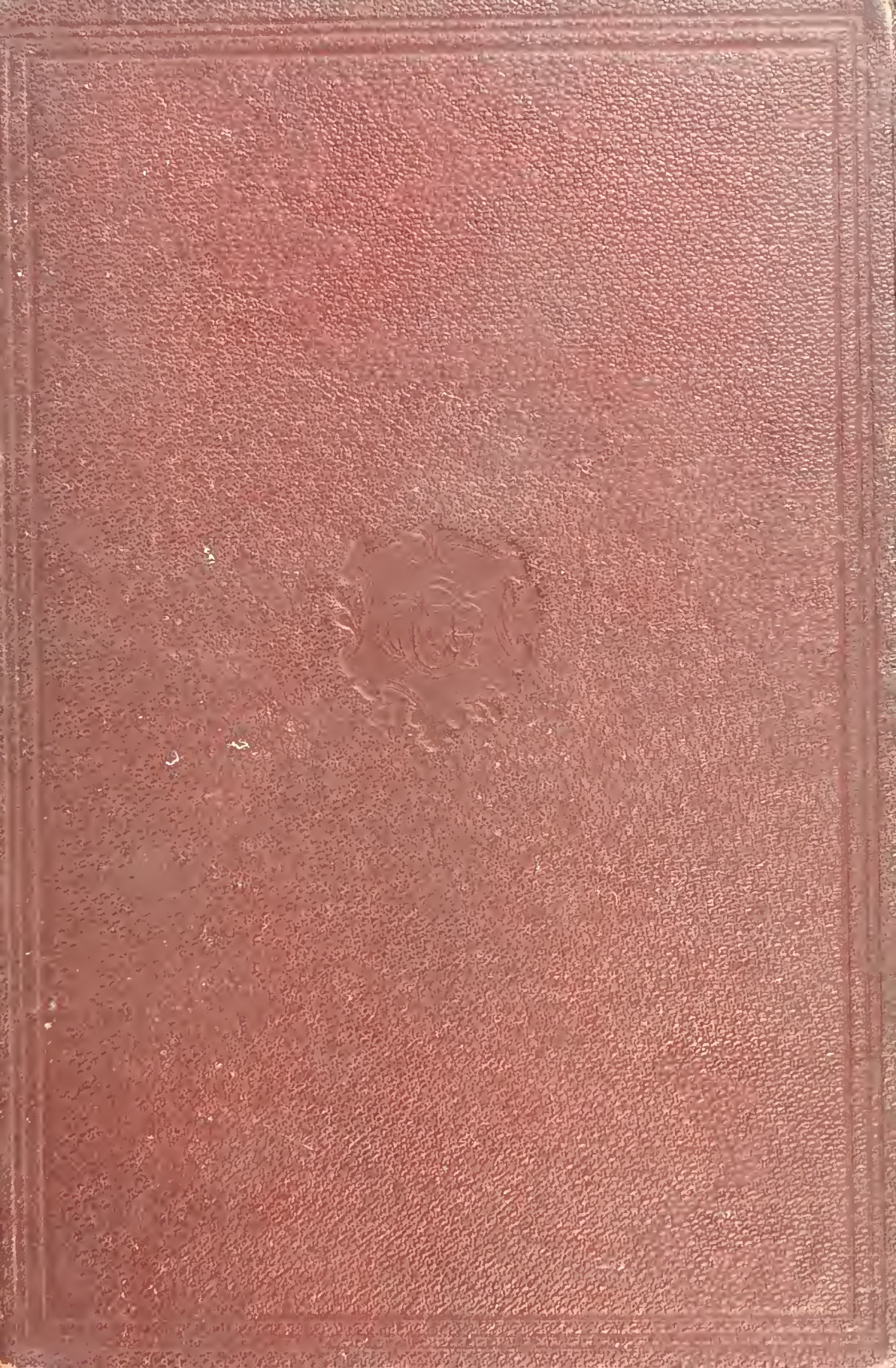






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OUTLINES
OF
THE DISEASES OF WOMEN.

BY
JOHN PHILLIPS, M.A., M.D. (CANTAB.), F.R.C.P..

ASSISTANT OBSTETRIC PHYSICIAN TO KING'S COLLEGE HOSPITAL; SENIOR
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EXAMINER IN MIDWIFERY TO THE UNIVERSITY OF CAM-
BRIDGE; HONORARY SECRETARY, OBSTETRICAL
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PREFACE TO THE SECOND EDITION.



THE Author, in bringing out a second edition of his work, begs to take this opportunity of acknowledging the very kindly reception given to it by members of the Profession, and to thank many friends for their valuable and honest criticisms.

Very little alteration has been made in the text, but it has been thought advisable to add short notices on "Kraurosis," "Deciduoma Malignum," "Movable Kidney," "Sterility," "Normal Secretions from the Genital Organs," and "Leucorrhœa."

The Literature appended to many of the chapters has been slightly revised and added to.

An additional Appendix "On the Advisability of Making a Local Examination," has been inserted, as resort to its use has been found of great value in the teaching of junior students.

68 BROOK STREET, LONDON, W.

January, 1897.

PREFACE TO THE FIRST EDITION.

THE following pages have been written entirely for the use of the Student and Junior Practitioner. They contain, therefore, much which may at first sight appear elementary; but no scientific knowledge of this subject can be attained without a close attention to its first principles.

For the proper study of the diseases of women, an accurate acquaintance with the female pelvic organs is essential; the first chapter has, therefore, been devoted to a short outline of their anatomy and physiology from a *gynæcological* standpoint. In order to assist beginners, the method of interrogating and examining, as constantly practised by the Author in the Out-Patient room, has been given in detail. Sepsis has been looked upon throughout the work as the most fertile element in the causation of pelvic disease; and the necessity of antiseptic manipulation, operation, and after-treatment (as far as possible), has been specially insisted upon.

The plan of the work, however, does not permit of details of the major operations of gynæcology, and hence nothing beyond passing notice of "Abdominal Sections" is given.

At the conclusion of the majority of the Chapters is appended, under the heading of "Literature," a list of the chief references bearing on the subject under consideration: these have been

selected from a large amount of material, as containing matter which should be of benefit to the more advanced student. Only those in the English language, however, have been given. This may at first sight appear somewhat questionable, but it has been the Author's experience that, unfortunately, too few medical students understand French or German sufficiently well to make a Bibliography in either of those languages desirable: he has, therefore, preferred not to encumber the text with useless matter.

The original illustrations comprise drawings in outline and from photographs. For the former, which are the large majority, the author is personally responsible; he has found them of considerable use in class instruction, and moreover they are easily copied upon the blackboard by any one having the most elementary knowledge of drawing.

The shaded figures are from photographs taken by Mr. G. Lenthal Cheatele (Demonstrator of Surgery to King's College), to whom the Author feels much indebted for the great care he has bestowed on their production; the drawings of microscopical slides, which are in outline, are also the result of his work.

For figures of the principal instruments, with which it is desirable that the Student should make himself thoroughly acquainted, the Author has to thank the makers, Messrs. Maw, Son, and Thompson; and Messrs. Krohne and Sesemann.

Finally, he has to express his obligations to Mr. C. W. Adams (Resident Accoucheur at King's College Hospital), for the large amount of time and patience bestowed on the work while passing through the Press.

71 GROSVENOR STREET, LONDON, W.

April 1893.

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9

OUTLINES OF THE DISEASES OF WOMEN.

CHAPTER I.

ANATOMY AND PHYSIOLOGY OF THE FEMALE PELVIC ORGANS.

This subject may be conveniently divided into five sections:—

- A. The anatomy of the External Genital Organs or Pudendum.
- B. The Pelvic Diaphragm or Floor, and its contents.
- C. The normal position of the Uterus and its relations to the other Pelvic Viscera.
- D. The vascular, lymphatic and nervous supply to the Pelvic Organs.
- E. The development of the Genital Organs.

(A) The Anatomy of the External Genital Organs or Pudendum.

Under the term “pudendum” we include all those portions of the external generative organs observed on inspection (Fig. 1): they are, in the virgin:

- 1. Labia Majora } situated laterally: these should be
- 2. Labia Minora } slightly drawn apart.

Then, commencing anteriorly, and passing backwards, we have:

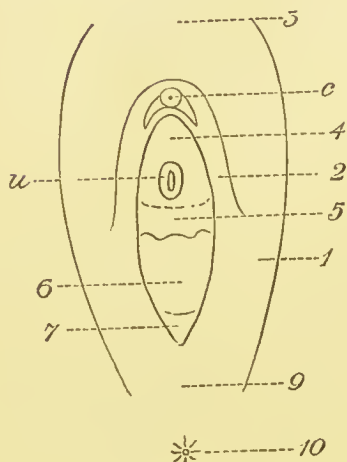
- 3. The Mons Veneris;
- 4. The Vestibule—containing the clitoris and its prepuce above (*c*), and the urethral orifice below (*u*);
- 5. The orifice of Vagina—partially or completely occluded by

6. The Hymen ;
7. The Fourchette—which, if retracted, produces a pouch with the Hymen, called
8. The Scaphoid Fossa ;
9. Perineal skin, covering the base of the perineal body.

The anus, although not a part of the pudendum proper, may be mentioned here.

The Labia Majora (Fig. 1: 1) are two folds of skin, arranged

FIG. 1.



The female pudendum (virgin). The patient is in the dorsal decubitus and the external labia are slightly drawn apart. (Outline drawing from a photograph.)

1. Labium majus (left).
2. " minus (left).
3. Mons Veneris (lower portion only shown).
4. Vestibule.
5. Vaginal orifice.
6. Hymen (lower surface).
7. Fourchette.
9. Perineal skin.
- c. Clitoris, with preputium above it.
- u. Urethral orifice.

with their long axes antero-posteriorly: they unite at their two extremities, but diverge between these points producing a slit, the vulval orifice (5). They are thickly covered with crisp and curly hair on their external, but more scantily on their internal, surfaces. They enclose fat, blood-vessels, and dartos; the round ligaments, after passing through the external abdominal rings, are lost in their substance. Anteriorly, where they unite over the symphysis pubis, an excessive deposit of fat is found, producing the so-called *Mons Veneris* (3), which is also covered with hair at and after puberty. Posteriorly, this fat disappears, and the labia unite to form a thinnish membrane called the fourchette (7), which forms the extreme anterior edge of the perineum.

The Labia Minora (Figs. 1 and 2: 2) consist of two cutaneous folds of a rosy colour, lying nearly parallel to the preceding: each arises from the corresponding external labium about half-way along its inner surface, and is about $1\frac{1}{2}$ to 2 inches in length. The two pass forward and divide at their terminations into two rami; the anterior or upper unites with its fellow of

the opposite side and forms the preputium clitoridis (a hood covering the analogue of the penis of the male), while the posterior or lower aids in forming its suspensory ligament.

The Vestibule (4) is a triangular flat surface of mucous membrane, bounded posteriorly by the anterior or upper margin of the vaginal opening, and laterally by the inner surfaces of the labia minora: the apex is marked by the clitoris with its preputium (*c*), near the base, and in the median line is the orifice of the urethra (*u*), which is usually described as a dimple, but consists of a right and left labium.

The clitoris is formed of two corpora cavernosa, which are attached to the rami of the ischium and pubes by means of crura. The glans clitoridis is composed of spongy erectile tissue.

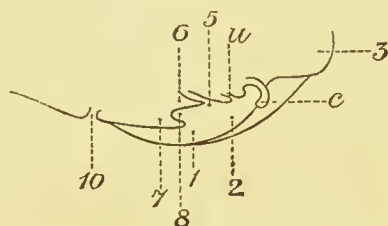
The Orifice of the Vagina (5) is formed anteriorly by the base of the vestibule, posteriorly by the edge of the hymen. The shape of this latter produces the various appearances seen in the vaginal opening. It may be a circular orifice or a slit directed transversely.

The Hymen (Fig. 1: 6), which is usually crescentic in shape with its concavity forwards, and arises from the anterior part of the perineal body, is by some considered as the lower end of the vagina, being the remains of the septum between the urogenital sinus and the genital ingrowth: others are of opinion that it belongs to the pudendum proper. Less common variations than this shape are the annular—where a

central aperture exists only—a cribriform, a fimbriated, and a completely imperforate kind; this last we shall consider later under retained menstruation (p. 104). It varies in texture, and may be of extreme delicacy or remarkable toughness. Three to five small fleshy tubercles, called *carunculae myrtiliformes*, are found at the site of the hymen and are the result of the passage of a large body (fœtus or polypus) through the vulva.

The Fourchette (Fig. 2: 7), which is only the united and thinned-out posterior edge of the external labia, can artificially be raised from the true perineal body by a hook: by so doing a sulcus is produced with the lower or posterior surface of the base of the hymen like the prow of a boat, and called the *scaphoid fossa* or *fossa navicularis* (8), whose boundaries would therefore be, anteriorly, the posterior surface of the hymen, and posteriorly the

FIG. 2.



Antero-posterior and vertical section of pudendum (left side) viewed from the patient's right side, the fourchette (7) is drawn down, producing with the hymen (6) the navicular or scaphoid fossa (8). The anus (10). The remaining numbers and letters as in Fig. 1.

anterior surface of the fourchette; this cavity does not exist unless artificially produced.

The Skin over the Perineum (Fig. 1 : 9) is from 1 to $1\frac{1}{2}$ inch in length antero-posteriorly, and covers the superficial and deep muscles of the perineal body.

The appearance of the pudendum in the virgin at and after *puberty*, with the labia majora retracted, is as described above. If the vulva, however, be viewed with the legs just enough parted for inspection, and no traction used, neither the clitoris nor the internal labia can be seen. The changes produced by repeated coition in a nullipara are usually (a) rupture of the hymen, usually in a median and posterior position: should the hymen be very dilatable, rupture may not take place even with labour; (b) the internal labia become more flaccid and pendulous, and therefore protrude between the external labia. (c) Brown pigmentation arises.

After Labour the hymen, if intact previously, is ruptured almost without exception; the fourchette is always torn through (inevitable laceration), and there may be other lacerations—*i.e.*, of the perineal body, about the urethra, or of the internal labia. The orifice of the vagina will admit two or even three fingers.

After the Menopause there is a tendency to return to the virgin appearance: both internal and external labia lose their fat; atrophy takes place and wrinkling disappears; the internal labia cannot be seen on inspection, but the vulval orifice tends to gape. The hair becomes grey, though frequently at a later date than that on the head.

The Glands of the Vulva, which consist chiefly of the sebaceous variety, are found on both labia, and secrete a more or less odorous material for the supposed purpose of lubrication.

The Glands of Bartholin, or **Vulvo-vaginal Glands**, are two in number, situated one on either side of the vaginal opening and anterior to the posterior layer of the triangular ligament: each is provided with a long duct which opens laterally near the hymen. The structure of the gland tissue is very similar to that observed in the pancreas and salivary glands.

Erectile Tissue.—The blood-supply to the vulva is a very free one, and in certain localities venous plexuses are found which have the characteristics of erectile tissue: their chief situations are in

- (a) The corpora cavernosa of the clitoris;
- (b) The glans clitoridis;
- (c) The bulbi vestibuli—which are two leech-shaped masses of erectile tissue of the size of an almond, lying one on either side of the vaginal orifice (Fig. 3, *B.v.*).

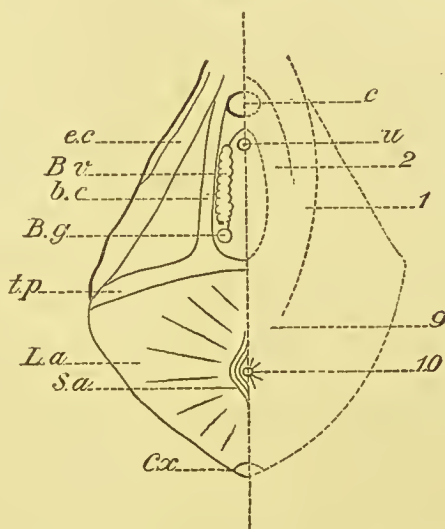
(B) The Pelvic Diaphragm or Floor, and its contents.

The pelvic floor can be looked upon as formed of—

(I.) An *under* convex surface, which consists of skin and the external genital organs already described above (the pudendum) and the anus.

(II.) An *upper* somewhat concave surface, covered by peritoneum, which is thrown into various folds aiding in the formation of the suspensory uterine ligaments (*vide* p. 20).

FIG. 3.



The under surface of the pelvic floor (patient in dorsal decubitus). On right side (observer's) skin and labia are intact (dotted lines). On left side, skin and superficial fascia removed.

- | | |
|--|---------------------------|
| <i>e.c.</i> Erector clitoridis muscle. | <i>Cx.</i> Tip of coccyx. |
| <i>b.c.</i> Bulbo-cavernosus muscle. | <i>c.</i> Clitoris. |
| <i>t.p.</i> Transversus perinei muscle. | <i>u.</i> Urethra. |
| <i>L.a.</i> Levator ani muscle. | <i>1.</i> Labium majus. |
| <i>S.a.</i> Sphincter ani muscle. | <i>2.</i> Labium minus. |
| <i>B.v.</i> Bulbus vestibulus (right side). | <i>9.</i> Perineal skin. |
| <i>B.g.</i> Bartholin's gland of right side. | <i>10.</i> Anus. |

(III.) The *Contents*, or the viscera and structures contained between these two surfaces, which consist of:

A superficial and deep musculature ;
then commencing anteriorly and immediately behind the symphysis pubis we have in order—

The retro-pubic fat ;

The bladder and urethra, with the ureters ;

The uterus, ovaries, and tubes, with

The vagina ;
 The structures known as the perineal body ;
 The rectum ; also,
 Blood-vessels, lymphatics, and nerves.

It will perhaps be more suitable to describe the Contents before proceeding to that of the serous surfaces.

1. **Musculature.**—On removal of the skin and superficial fascia from the anterior half, we meet with the so-called perineal muscles : these are six in number (three pairs), and are arranged in the form of an isosceles triangle (Fig. 3). They are—

1. Bulbo-cavernosus (*b.c.*).
2. Erector clitoridis (*e.c.*).
3. Transversus perinei (*t.p.*).

The first and third pairs meet in a central point called the *centrum tendineum* ; the bulbo-cavernosus is on either side of the vaginal slit and just external to the bulbi vestibuli, which are cavernous structures as already mentioned. Continuous with the *centrum tendineum* and passing round the anus is the superficial sphincter ani.

The deep layer consists of the coccygeus and levator ani. These are of great importance, as they support the viscera in the pelvic cavity and surround the various structures which traverse the pelvic floor.

The Levatores Ani (Fig. 3 : *L.a.*) are two in number, and may together be considered as the pelvic diaphragm : each arises in three portions—in front, from the posterior surface of the pubic ramus ; posteriorly, from the inner surface of the ischiatic spine ; and a median portion between these two origins from the so-called “white line” of pelvic fascia. The muscle takes an oblique course downwards and towards the median line, and is inserted in four different divisions :

1. Those fibres inserted into the sides of the apex of the coccyx ;
2. Those uniting with their fellows of the opposite side and forming a median fibrous raphé from the coccyx to the anus ;
3. The majority of the muscle which is inserted into the rectum and unites with the sphincter ani muscle ;
4. The anterior fibres, lost upon the walls of the vagina.

The Coccygeus is situated immediately behind the first of these four divisions and has a similar action.

2. The Uterus, Tubes, and Ovaries, with the Vagina.

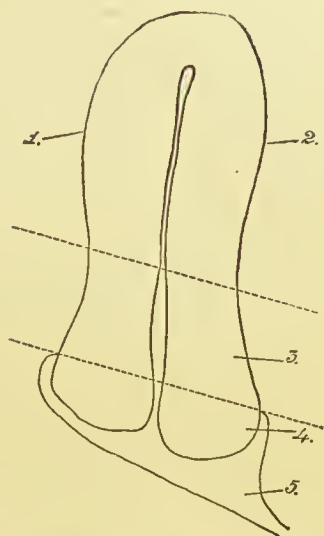
(a) **The Uterus** is a hollow muscular organ roughly pyriform in shape, the narrow end being downwards, and lies in the pelvic cavity between the bladder and rectum. It is composed of the

body or corpus uteri and the neck or cervix uteri, the upper part of the former being termed the fundus. At the point of union of the corpus and cervix and on the posterior surface there is a slight constriction, which is called the isthmus, and indicates the site of the internal os uteri. It is flattened from before backwards, the anterior surface being only very slightly convex, the posterior markedly so both transversely and from above downwards (Figs. 4 and 5).

The cavity of the uterus in a nullipara presents a triangular appearance (Fig. 6), the sides of the triangle being convex inwards. This may be observed by making a coronal section by which the anterior and posterior halves are separated. The triangle will then be seen to have its apex downwards and corresponding to the opening of the uterine cavity into the cervix, while at the base, right and left, are the openings of the Fallopian tubes (3 and 3'). The whole of this cavity is lined by mucous membrane.

The cavity alters in shape after pregnancy has occurred, the triangle having its sides straighter, and the contained space therefore larger, as is seen in Fig. 7.

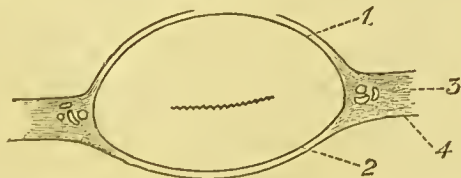
FIG. 4.



Vertical mesial section of virgin adult uterus. (Outline drawing from nature.)

1. Posterior convex wall.
2. Anterior somewhat flattened wall.
3. Supra-vaginal cervix (portion between dotted lines).
4. Vaginal portion of cervix (portio vaginalis).
5. Vagina, the walls drawn apart by tenacula.

FIG. 5.



Transverse section through uterine fundus and immediately below the level of Fallopian tubes (in a virgin). (Outline drawing from nature.)

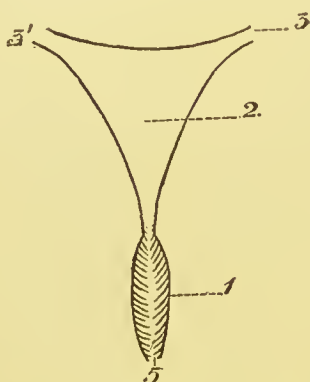
1. Convex posterior surface.
2. Slightly convex anterior surface.
3. Connective tissue and blood-vessels between the layers of the broad ligaments.
4. Peritoneum.

The cavity of the cervix is fusiform in shape, with an upper opening communicating with the uterus and called the *internal*

os uteri, and a lower opening communicating with the vagina, and termed the *external os uteri*. The mucous membrane lining this cavity is thrown into folds with a peculiar arrangement like the feathers of a quill pen, called the *arbor vitæ*, to be described later.

The cervix itself has been divided into two or even three sections by different observers, but the simplest method is the former, by which any portion felt projecting into the vagina is called the *vaginal* portion, or *portio vaginalis* (Fig. 4: 4), while all the organ between the reflection of the vaginal mucous membrane and the level of the internal os uteri is the *portio supra-vaginalis*, or supra-vaginal portion (3). The former can be felt *per vaginam* projecting more or less into the vagina, and the

FIG. 6.

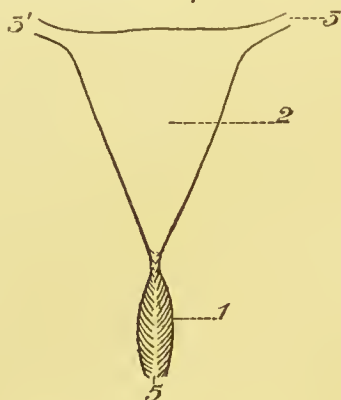


Anterior and internal surface
of an adult virgin uterus.

(Outline drawings from nature.)

1. Cervix.
3 3'. Orifices of Fallopian tubes.

FIG. 7.



Anterior and internal surface
of a parous uterus.

2. Cavity of uterus.
5. Os uteri externum.

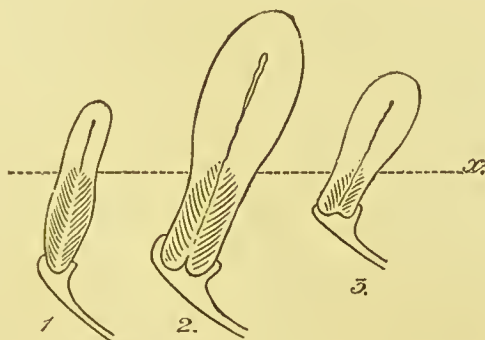
external os uteri can be made out by the examining finger as a dimple. The cervix projects a varying amount into the vagina, the anterior lip appearing shorter than the posterior: it is almost flush with the vaginal roof in the infant, while after the menopause gradual atrophy takes place. The os uteri externum is a transverse slit about $\frac{1}{8}$ inch in diameter in the nulliparous woman: it becomes broader after labour ($\frac{1}{2}$ to $\frac{3}{4}$ inch), and more patulous, with slight eversion of the cervical mucous membrane.

Dimensions of the Uterus and Cervix as a whole.—The total length in the fully developed virgin by external measurement amounts to about 3 inches, the cavity being $2\frac{1}{2}$ inches. The relation of the length of the true uterine to the cervical canal varies, but usually it is $1\frac{1}{2}$ inch and 1 inch respectively. The

greatest breadth of the uterus is opposite the origin of the Fallopian tubes, and its thickness is most marked at the centre of the body, where it measures from $\frac{4}{5}$ inch to 1 inch. The weight of the uterus in the nullipara is usually about 9 to 10 ārachms, but may vary between 7 and 12, while at the full term of pregnancy it may reach as much as $1\frac{1}{2}$ lb.

In the Infant and before Puberty the cervix is larger than the body of the uterus, and the arbor vitæ is not well marked, although it extends high up into the cavity. The cervix does not project into the vagina, the fundus is not markedly convex, and the cavity is attenuated as in Fig. 8 : 1, the sides being convex. With the onset of puberty come the changes which produce the fully developed virgin uterus (Fig. 8 : 2).

FIG. 8.



Relation of the body of the uterus to the cervix uteri (diagrammatic).

- In (1) Infancy (from a child 3 years old).
- „ (2) Adult nullipara (from a patient aged 21 years).
- „ (3) Old age (from a woman aged 61 years).
- x. Corresponds to the internal os uteri.

With the arrival of the *menopause* the uterus undergoes atrophy, the cervix being scarcely felt per vaginam, and not being clearly distinguishable from the body; the arbor vitæ becomes less distinct, and the total length may only be from $1\frac{1}{4}$ to $1\frac{1}{2}$ inch (Fig. 8 : 3).

The structure of the uterine wall is as follows :—

1. Serous or peritoneal layer (external); *vide* p. 20;
2. Muscular;
3. Muscularis mucosæ;
4. Mucous membrane.

The *Muscular Coat* only assumes any importance when pregnancy occurs; it then undergoes enormous hypertrophy, and a division into various layers can be definitely made. The tissue is composed of plain muscular fibre cells, and a sphincteric

arrangement is said to be present at the three orifices of the cavity, especially at the internal os uteri. The most internal layers send up ingrowths of muscular tissue into the interstices between the uterine glands of the mucous membrane, which ingrowths are called *muscularis mucosæ*; there is no true sub-mucous tissue.

The Mucous Membrane of the Uterine Cavity is unique in being

FIG. 9.



Vertical section of the mucous membrane of the human uterus.

- | | |
|---|---|
| e. Columnar epithelium, the cilia absent. | gg. Utricular glands. |
| ct. Intra-glandular connective tissue. | vv. Blood-vessels. |
| mm. Muscularis mucosæ. | (From Landois & Stirling's <i>Physiology</i>). |

subjected to periodic monthly changes, the exact nature of which is still in dispute. It can be said however, certainly, that more or less of the mucous membrane is shed at monthly intervals accompanied by hæmorrhage from the bared surface, and termed "menstruation." This will be more fully diseussed in Chap. iii. The mucous membrane, if described when fully developed—*i.e.*, shortly before menstruation—is about $\frac{1}{6}$ inch in thickness. It consists chiefly of what are called utricular glands, which are

implanted in, and supported by, areolar tissue and the muscularis mucosæ (Fig. 9 : *gg*).

These glands are tubular, and run nearly at right angles to the external surface of the uterus : they are single for the greater part of their course, may branch towards their ends, but rarely into more than two divisions. They are lined throughout by ciliated epithelium lying on a thin basement membrane ; the ciliæ are said not to extend to the extremities of the bifurcations.

The Mucous Membrane of the Cervical Canal is of an entirely different character to that of the uterine cavity, and the change takes place abruptly at the os uteri internum. The anterior and posterior surfaces are thrown into oblique and parallel folds, which run into a central longitudinal ridge having the appearance of a feather.

The mucous membrane consists of columnar and ciliated cells only on the ridges of the folds, columnar or cubical in the furrows. Opening on to these are racemose glands which are embedded in the connective tissue. They are lined by columnar epithelium.

At the os externum the mucous membrane again suddenly changes from columnar to squamous epithelium, which lies in several layers over papillæ and has much the structure of true skin : it contains no true glands, although simple depressions or pits exist which have been given that name. The so-called *ovula Nabothi* which appear as yellowish vesicles, are supposed to be due to dilatation of the racemose glands.

(β) **The Fallopian Tubes** are two oviducts, and convey the ovum to the uterus and the spermatozoa to the ovary. They arise at the two angles of the uterine fundus and take an undulating course towards the pelvic wall ; they vary in length from 4 to 6 inches. The direction of each tube is first straight, then forwards and outwards, and lastly backwards and inwards (Fig. 10).

The tube may be divided into three parts from within outwards—viz., (1) the isthmus, (2) the ampulla, (3) the fimbriated end.

The Isthmus is the part arising from the uterus and is the narrowest portion : its lumen admits a bristle (Fig. 10 : 2).

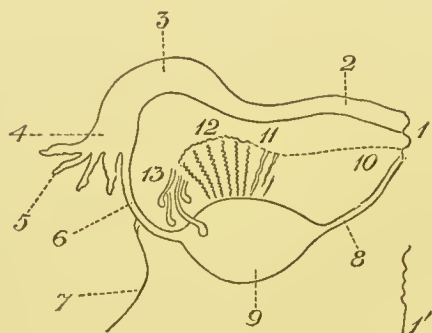
The Ampulla is the most dilated part (Fig. 10 : 3), while the fimbriated end or *infundibulum* consists of a trumpet-shaped extremity with deeply serrated margins (Fig. 10 : 4). One of the processes or fimbriæ is attached to the ovary, and is called the *infundibulo-ovarian fimbria* (Fig. 10 : 6). This fringe of processes surround the outer opening of the tube, or ostium abdominale, which is continued as a "gutter-like" groove along the edge of the already-mentioned ovarian fimbria.

The Structure of a Fallopian Tube consists of:

1. Peritoneum, over a majority of its surface—*i.e.*, except over the portion contained between the layers of the broad ligament;
2. A subserous connective-tissue layer;
3. Longitudinal
4. Circular } muscular fibre layer;
5. Mucous membrane.

The mucous membrane is thrown into longitudinal folds, which are slightly marked at the isthmus, more so at the ampulla, and strongly developed at the fimbriated end. The epithelium cover-

FIG. 10.



Posterior surface of left broad ligament. (Outline drawing, slightly altered from nature.)

- | | |
|---|--|
| 1, 1'. Cut end, and portion attached to the uterus. | 7. Infundibulo-pelvic ligament. |
| 2. Isthmus of Fallopian tube. | 8. Ovarian ligament. |
| 3. Dilated portion or ampulla. | 9. Ovary. |
| 4. Fimbriated end. | 10. Remains of Wolffian duct. |
| 5. One of fimbriae. | 11, 12, 13. Posterior, middle and anterior portions of Wolffian body remains (parovarium). |
| 6. Grooved ovarian fimbria. | |

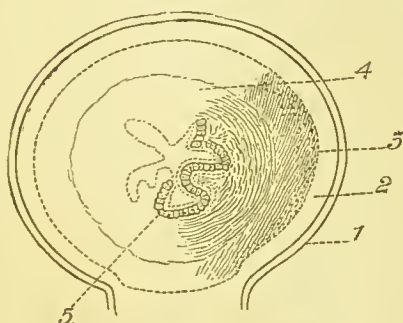
ing these is ciliated and columnar; it is transformed into the flattened epithelium of the peritoneum at the ostium abdominale. A section of the tube at the isthmus gives a somewhat stellate appearance (Fig. 11), while Fig. 12 gives the appearance at the fimbriated end.

The peritoneal cavity, it will be noted, is not a closed sac in the female.

(γ) **The Ovaries** are two almond-shaped or flattened ovoid bodies lying to the right and left of the uterus; each is apparently attached to the *posterior* surface of the posterior layer of its corresponding broad ligament, although in reality situated between the two layers of that structure. In weight, an ovary

may vary within physiological limits from $3j$ to $5ij$, but in old age it may be reduced to as little as twenty grains. The dimensions of the ovary taken as an average and *in situ* are—length $1\frac{1}{3}$ or $1\frac{1}{2}$ inch, breadth $\frac{3}{4}$ inch, thickness $\frac{3}{8}$ inch. Each has two surfaces and two borders, an upper and lower surface and an anterior and posterior edge. The attachment to the broad ligament is by the anterior edge alone, which is called the hilum. Its normal position is a half-floating one (Fig. 18 : 3). At its site of attachment there is a *whitish line*. In addition to the broad ligament as a means of support it has two other ligaments proper to itself and an accessory one (the infundibulo-ovarian fimbria).

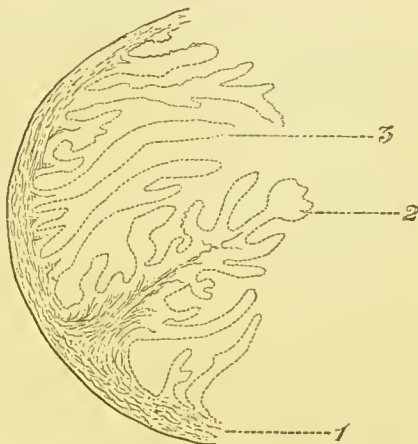
FIG. 11.



Transverse section of healthy Fallopian tube (uterine end).
(Semi-diagrammatic.)

1. Serous coat.
2. Subserous connective - tissue layer.
3. Muscular coats (the longitudinal fibres in section and external).
4. Submucous layer.
5. Mucous membrane, the longitudinal ridges seen in section: epithelium, columnar, and ciliated.

FIG. 12.



Transverse section of a portion of healthy Fallopian tube (fimbriated end).

1. Submucous layer.
2. Mucous membrane thrown into intricate folds.
3. Simple longitudinal fold in section.

1. The ovarian ligament, which arises at the angle of the uterus and the Fallopian tube and is attached to the inner extremity of the ovary (Fig. 10 : 8).

2. The infundibulo-pelvic ligament, which is nothing more than the free margin of the broad ligament, immediately below the fimbriated extremity of the Fallopian tube. (*Vide* Fig. 10 : 7.)

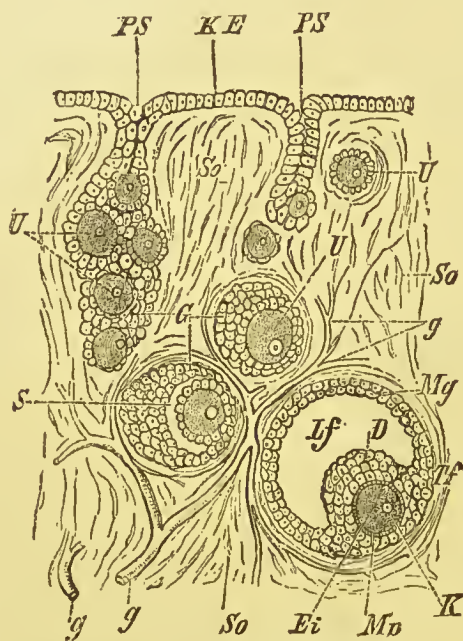
Structure of the Ovary (Fig. 13).—This consists of :

1. An outer covering of germinal epithelium which is columnar and ceases abruptly at the hilum, where the change from the flattened and pavement epithelium of the peritoneum

to the columnar is well marked by the so-called "white line" (Fig. 13: *KE*).

2. A matrix of connective-tissue network which at the outer part of the organ becomes more dense, and is sometimes called the tunica albuginea. The substance of the ovary is divided into two

FIG. 13.



Section of mammalian ovary showing development of ova and their follicles.

- | | |
|--|--|
| <i>Ei</i> . Ripe ovum. | by means of which some of the nests retain their connection with the epithelium. |
| <i>G</i> . Follicular cells of germinal epithelium. | <i>S</i> . Cavity which appears within the Graafian follicle. |
| <i>g</i> . Blood-vessels. | <i>So</i> . Stroma of ovary. |
| <i>K</i> . Germinal vesicle and spot. | <i>Tf</i> . Theca folliculi, or ovi-capsule. |
| <i>KE</i> . Germinal epithelium. | <i>U</i> . Primitive ova. |
| <i>Lf</i> . Liquor folliculi. | |
| <i>Mg</i> . Membrana granulosa. | |
| <i>Mp</i> . Zona pellucida. | |
| <i>PS</i> . Ingrowths from germinal epithelium, ovarian tubes, | |

(From Landois & Stirling's *Physiology*.)

zones—viz., the cortical or parenchymatous, and medullary or vascular zone, the latter being found usually at the hilum (*So*).

3. Groups or chains of Graafian follicles in various stages of maturation: those in the earliest stage are at the surface and very numerous, the larger and more mature lie deeper, are fewer in number, and arranged in a chain-like manner (*U*). There are

blood-vessels and nerves which enter at the hilum, and a few plain muscular fibres also occur. Each Graafian follicle (*S*) contains an ovum. There is some doubt as to the origin of these follicles, but the generally accepted view is that they are derived from an outgrowth of the ovarian stroma which encloses the ingrowing cells of the germinal or surface epithelium (*PS*).

In *structure* a Graafian follicle consists of :

- (1) *Membrana propria*;
- (2) A *membrana granulosa* (*Mg*), from its dark appearance, which in one part of the follicle is heaped up into a mass called the *discus proligerus* (*D*) in which is contained
- (3) The ovum (*Ei*);
- (4) The remainder of the cavity is filled with a thin serous fluid—the *liquor folliculi* (*Lf*).

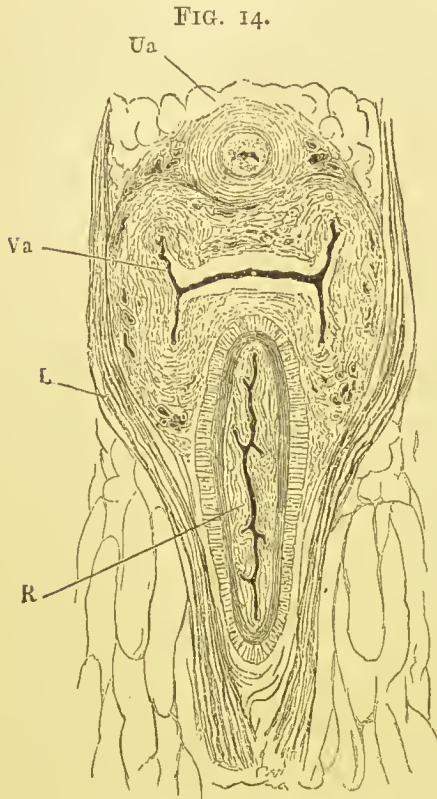
Variations in the Ovary at different Ages.—In the infant it has none of the adult shape, but is like a flattened sausage with smooth surfaces lying parallel to and below the level of the Fallopian tube; after puberty it assumes the almond-shape by which it is usually recognised, and as the Graafian follicles rupture they leave small scars on its surface which give it an irregular appearance. In old age the Graafian follicles disappear and the ovary consists of nothing but a little fibrous tissue and blood-vessels.

(8) It will be convenient here to consider the **Parovarium**. Lying between the layers of the broad ligament and situated between the hilum of the ovary and the Fallopian tube is a body consisting of from 9 to 15 tubes more or less obliterated, arranged in radiating manner with a circumferential duct to unite their distal ends: this may be continued between the layers of the broad ligament parallel to the Fallopian tube, and be lost in the substance of the uterus (*Gärtner's duct*). These are the remains of the Wolffian body, and they can best be seen by holding the stretched broad ligament up between the eye and the light. They are of great importance pathologically, as dilatation of them produces parovarian cysts (Fig. 10: 11, 12, 13).

The Vagina is usually described as a tube. This is erroneous; it is a slit or fault in the pelvic diaphragm, and runs at an angle of 60° to the horizon, or about parallel with the plane of the inlet of the pelvis. It lies between the bladder in front and the rectum and perineum behind. The vagina has in section the appearance of a line placed transversely in the pelvis, and is therefore at right angles to the direction of the vulval opening, which is an antero-posterior one (Fig. 14).

The boundaries of the vagina may therefore be described as an upper extremity, consisting of the cervix with the vaginal roof, the

hymen as its lower extremity, and two surfaces, an anterior and posterior. Tracing the anterior surface from below upwards, we find it is straight, and attached closely in its lower half to the urethra, which can be felt through it like a crow-quill: the mucous membrane over it is arranged in two sets of transverse or oblique folds, somewhat like the arbor vitæ of the interior of the cervix. In the



Horizontal section of pelvic floor at the pelvic outlet.

(From Macalister's *Anatomy*).

Ua. Urethra. Va. Vagina.
L. Levator ani. R. Rectum.

towards the bladder, when its axis becomes almost vertical. The functions of the vagina are:—

1. As an organ of coition;
2. As a passage for the fœtus during labour;
3. Absorptive, which is very slight compared to that of the uterus.

Structure.—(1) The mucous membrane consists of several layers

upper half it is loosely attached to the posterior wall of the bladder and is less rugose, and is reflected on to the anterior lip of the cervix, forming the anterior cul-de-sac. The whole length of this wall is about $2\frac{1}{4}$ inches (Fig. 16).

The posterior surface is triangular in shape, with a sinuous and rugose surface: it extends from the base of the hymen to its reflection on to the posterior lip of the cervix, which produces the posterior fornix or cul-de-sac; it is deeper than the anterior, and the whole length is 3 inches.

The vagina becomes tubular in shape only when the finger or instruments are introduced, or a fœtus is being expelled. It is capable of great dilatation, especially in its upper portion. The direction of the slit is usually in a straight line, but the condition of the bladder or rectum will obviously alter its position—viz., a full bladder pushing it towards the sacrum, a full rectum

of epithelium, which is of the squamous variety at the surface, and tends to become cylindrical deeper down. No true glands exist, but small pits or depressions occur on the surface, which may or may not secrete mucous matter.

(2) Beneath this is a layer of connective tissue raised into papillæ, which are productive of the rugose appearance of the vaginal mucous membrane.

(3) One or more layers of unstriped muscular fibres arranged in a longitudinal and circular manner.

The Bladder.—The wall of the bladder is composed of mucous, muscular, and peritoneal layers, which need not be fully described here. The cavity has three openings, those of the two ureters and the urethra. The ureters pass obliquely downwards and inwards through the bladder wall, then enter the viscus by valve-like internal openings, $2\frac{1}{2}$ to 3 centimètres apart, which form with the urethral orifice the angles of the trigone. If a line be drawn joining the two ureteric openings, all the bladder above it is called the *fundus*, all below it the *base*.

The ureters have important anatomical relations with the cervix (Fig. 15). As each ureter descends into the pelvis, it is crossed at the level of the external os uteri by the uterine artery, which passes in front of it on its way to the uterus. At this point the ureter is only $\frac{3}{8}$ inch from the cervix: it then lies between the anterior wall of the vagina and the posterior wall of the bladder, and about the middle of the former pierces the bladder wall.

The exact distance from the cervix to each internal ureteric opening is only 3 centimètres, or less than $1\frac{1}{8}$ inch. The shape of the bladder depends on whether it is in a full or empty state: in the former condition it is probably flask-shaped, the neck being at the urethra and the fundus rising above the symphysis pubis: when empty it lies behind the symphysis, and usually presents in a mesial section a forked appearance, and with the urethra produces a Y-shape, the posterior leg of the letter being the shorter. The fundus when seen from above would show a tendency to concavity (Fig. 16).

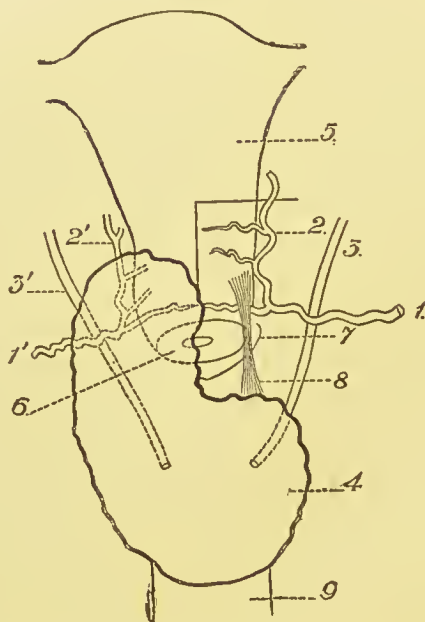
Urine is expelled by a contraction of the bladder, or systole; it is immediately relaxed, and probably remains a flaccid sac, passively dilating with the incoming urine from the ureters. During labour it is drawn up above the symphysis pubis.

The Urethra (Fig. 16: 3) is about $1\frac{1}{2}$ inch long and a closed slit, the lumen being like that of the vulva, antero-posterior. It runs parallel to the vagina, and has two openings; into the bladder and externally. The wall is composed of unstriped muscular fibre and mucous membrane, which latter is thrown into longitudinal folds and contains mucous glands. At the orifice are villous tufts,

while on either side can be seen the openings of *Skene's glands*, two small blind sacs or diverticula, running parallel to its longitudinal axis.

The Rectum (Fig. 17) is that part of the large bowel lying between the sigmoid flexure and the anus: it commences at the left sacro-iliac synchondrosis, and therefore in the left posterior quarter of the

FIG. 15.



Diagrammatic outline drawing to illustrate the relations of the ureters to the cervix uteri and uterine artery. (From the front.)

The whole of the anterior wall of the bladder has been removed, and a portion of the posterior wall on the subject's left side; the peritoneum has been dissected off to show the uterine artery, utero-vesical ligament, and a window for display of cervix. On the right side these structures have been dotted in.

- | | |
|---|-----------------------------|
| 1 1'. Uterine artery. | 6. Cervix displayed through |
| 2 2'. Its ascending anastomotic branch. | a window in anterior |
| 3 3'. Ureter. | fornix (7). |
| 4. Bladder. | 8. Utero-vesical ligament. |
| 5. Body of Uterus. | 9. Vagina. |

pelvis, and passes downwards, backwards, and inwards until it reaches the middle or lower border of the third sacral vertebra. It is then loosely adherent to the posterior vaginal wall until the anus is reached, where the perineal body intervenes for about $1\frac{1}{2}$ inch. The anus is about 1 inch long, and is the termination

FIG. 16.

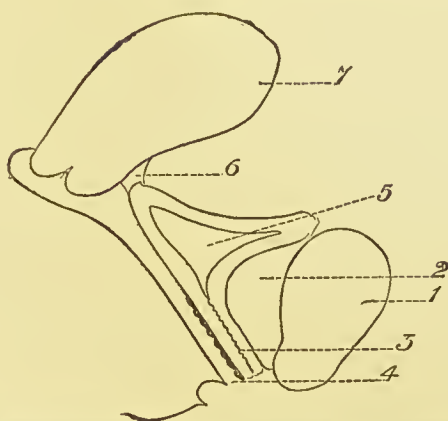
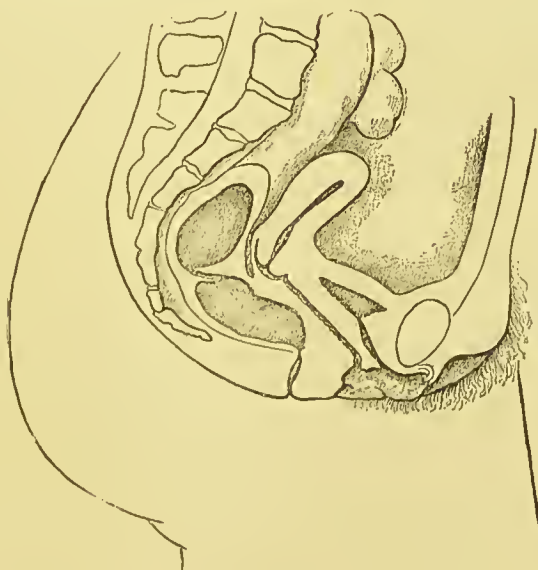


Diagram to illustrate relations of bladder and urethra to vagina and uterus. The figure 6 lies in the utero-abdominal pouch.

- | | |
|--|--|
| 1. Section through cartilage of symphysis pubis. | 5. Contracted bladder. |
| 2. Retro-pubic fat. | 6. Cellular tissue between cervix and bladder. |
| 3. Urethra. | 7. Uterus. |
| 4. Orifice of vagina. | |

FIG. 17.



Vertical mesial section of female pelvis. (After Ranney.)

The bladder is empty, the rectum full. A utero-abdominal pouch is present but no utero-vesical. The posterior cul-de-sac is much diminished in size.

of the rectum: it finds its exit in an axis almost at right angles to the vagina, is guarded by a strong internal and external sphincter, and may be looked upon as a closed orifice except during defecation or in the pathological condition of prolapsus ani.

The Perineal Body is a somewhat triangular mass separating the lower ends of the vagina and rectum. It joins the levatores ani and the superficial perineal muscles into one mass, gives the anus its backward direction, and strengthens a part which is liable to much stretching during labour. It measures $1\frac{1}{2}$ inch from above downwards, and is less than an inch thick.

The Retro-pubic Fat.—This is a wedge-shaped mass of adipose tissue, which in section has a triangular appearance (Fig. 16: 2). It separates the bladder and urethra from the posterior surface of the symphysis pubis.

(II.) The *upper* and somewhat concave surface of the pelvic floor is formed by peritoneum, which passes over the organs already detailed, producing various fossæ, but is continuous throughout except at the ostium abdominale of each Fallopian tube (p. 11). The best method of describing its arrangement is by commencing at the anterior abdominal wall, and travelling in a direct line backwards towards the spine. The bladder is supposed to be empty—*i.e.*, Y-shaped—and the rectum moderately dilated (Fig. 17).

The peritoneum passes downwards over the fundus of the bladder and then along its slightly concave upper surface, from which it is reflected about the level of the internal os uteri on to the anterior wall of the uterus. A *utero-abdominal* pouch is thus formed, in which intestines may lie (Fig. 17).

The peritoneum is so far loosely attached to the subjacent structures; but it becomes closely adherent to the uterine wall *above* the level of the internal os uteri. Should the bladder be in a state of distension, the peritoneum will take a different course, and will pass from the anterior abdominal wall on to the bladder fundus, then dip down along its posterior convex wall before being reflected on to the anterior uterine wall, forming the so-called *utero-vesical pouch* in which no intestine is present (Fig. 19: 11). No *utero-abdominal* pouch is in this instance produced.

On either side of the median line are two folds of peritoneum, which pass from the bladder to the junction of uterus and cervix. They are called the *utero-vesical ligaments*, and bound the utero-vesical pouch laterally (Fig. 19: 7). A small amount of plain muscular fibre is present in these folds.

Tracing the peritoneum, still closely attached to the uterus, it passes over the fundus on to the posterior wall, almost entirely covering it. It then usually for about an inch lies on the

posterior cul-de-sac of the vagina, and is reflected on to the rectum, forming a *retro-uterine pouch*, or pouch of Douglas, its depth, and the amount of overlapping of the vaginal fornix, varying and altering with the state of distension of the rectum (Fig. 19: 10). The peritoneum therefore extends to a lower level in the posterior than in the anterior cul-de-sac. Its boundaries are, *laterally*, the folds of the utero-sacral ligaments; these arise from the lower and lateral parts of the uterine body near the level of the internal os uteri on either side, and pass outwards and backwards by the rectum to be inserted into the sides of the second sacral vertebra: they thus partly encircle the rectum (Fig. 19: 6). The *upper* surface is open.

The *posterior* boundary is formed by the peritoneum overlying the rectum and by the sacrum; *anteriorly* and below is the posterior fornix (1 inch), and above, the posterior wall of the supra-vaginal cervix. Intestine passes into this pouch, varying in amount according to its depth.

The Fallopian tubes, stretching out transversely across the pelvis from the uterine cornua, break the regularity of the peritoneal arrangement from before backwards. Starting from the surface just external to the utero-sacral pouch, it will be found that a fold of the peritoneum passes upwards and over the Fallopian tubes and descends again in front of its ascending portion, becoming finally continuous with that covering the bladder. There are thus two layers of peritoneum, which if seen in section are nearly parallel in their upper two-thirds, but diverging in their lower third on both sides of the uterus: these are the broad ligaments (*vide* Fig. 18: 1, 2). An imaginary vertical section from above downwards and near the ovary would give the following appearance:

Between the layers of the broad ligaments are—

1. The ovaries, which project so much through the posterior layer as to appear attached externally (Fig. 18: 3);
2. The parovarium (6);
3. The Fallopian tubes (5);
4. A large quantity of connective tissue;
5. Arteries and venous plexuses (7);
6. Lymphatics.

The broad ligaments are inclined at an angle of 60° to the horizon, so that the posterior layer will look backwards and upwards, and the anterior layer downwards and forwards.

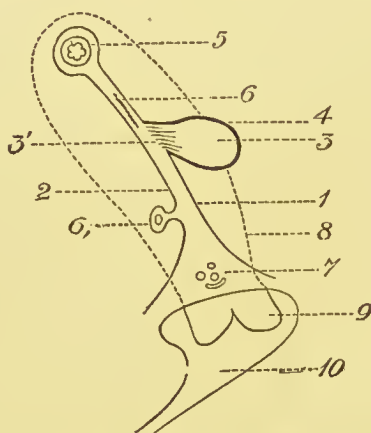
A surface view of the peritoneum from above will appear as indicated in Fig. 19.

The Arrangement of the Cellular Tissue of the pelvis is of importance: it is abundant in the anterior cul-de-sac, between the

vesico-vaginal pouch above and the anterior vaginal fornix below, and around the cervix (peri-cervical tissue), from which it spreads into the space between the layers of the broad ligament. This must be remembered in supra-vaginal amputation of the cervix, as cutting into the anterior fornix does not necessarily open the peritoneal cavity. The supra-vaginal portion is by means of this cellular tissue in intimate relation with the posterior wall of the bladder (Fig. 16 : 6).

In the posterior fornix only one-third of an inch of tissue intervenes between it and the pouch of Douglas (Fig. 17). It is therefore quite easy to penetrate into the peritoneal cavity by an incision there.

FIG. 18.



A vertical section of the left broad ligament (through the ovary), viewed from the left side. (Semi-diagrammatic.)

- | | |
|---|---|
| 1. The posterior layer of the broad ligament. | 6. Section through round ligament. |
| 2. Anterior layer. | 7. Vessels at base of broad ligament in section. |
| 3. The ovary (oöphoron). | 8. The uterus: its outline is dotted in to show its relation to the different structures. |
| 3'. Hilum of ovary (paroöphoron). | 9. Cervix uteri. |
| 4. Germinal epithelium. | 10. Vagina. |
| 5. The Fallopian tube. | |
| 6. Parovarium. | |

(C) The Normal Position of the Uterus and its Relations to the other Pelvic Viscera.

With an empty bladder and rectum it is found that the axis of the body of the uterus and the long axis of the cervix do not correspond; they meet at a more or less obtuse angle. This is best ascertained by measuring along the anterior wall of each: the angle is found to vary from 165° to 135° , or even 120° . This is the normal or physiological condition, which is one of slight

antelexion. The position of the uterus changes from time to time and under different circumstances; it lies roughly in the centre of the pelvic cavity, the fundus being just below the brim of the pelvis. Its long axis coincides very nearly with the axis of the pelvic inlet, but is slightly behind the centre of the true conjugate diameter: hence it is about at right angles to the plane of the inlet and to the vaginal and urethral axes, while it is parallel to the anal axis. The uterus lies with its anterior surface touching the bladder, no intestines lying in the utero-vesical space. There is slight dextral torsion of the organ on its long axis, so that the left cornu with its Fallopian tube is rotated somewhat forward, toward the symphysis pubis, the right backwards and away from it. The cervix should point backwards and downwards, the os uteri looking into the hollow of the sacrum. The uterus is retained in this position by (a) its several ligaments—viz.:

1. **Broad ligaments** laterally—which suspend it and by which side to side movement is controlled.

2. **Utero-sacral ligaments**—which with the anterior wall of the vagina form a beam traversing the pelvic cavity antero-posteriorly, and in which the uterus finds support, being attached firmly to both (Fig. 19: 6).

3. **Utero-vesical ligaments** (Fig. 19: 7).

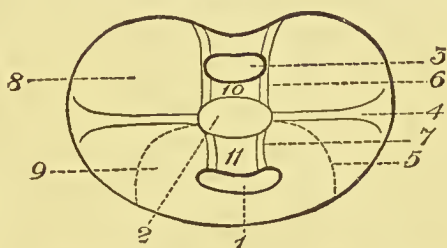
4. **Round ligaments**—these by their course prevent backward displacement of the uterine fundus. They pass in front of the deep epigastric artery, downwards, inwards and backwards between the layers of the broad ligaments to their insertion just below the uterine cornua (Fig. 19: 5).

(b) two extrinsic forces—viz.:

1. The elasticity of the pelvic floor. 2. The perineal body, which is believed to act as a support, but the value attached to it is exaggerated.

The pelvis is placed in such a position in the erect posture

FIG. 19.



Peritoneal surface of the pelvic floor from above. (Diagrammatic.)

1. Bladder in section.
2. Uterus.
3. Rectum.
4. Fallopian tube.
5. Round ligament showing through peritoneum.
6. Utero-sacral ligament.
7. Utero-vesical ligament.
8. Para-rectal pouch.
9. Para-vesical pouch.
10. Douglas' pouch.
11. Utero-vesical pouch.

that its cavity is not subject to *direct* abdominal pressure, the axis of the pelvis being backwards and downwards, while that of the abdomen is perpendicular.

The uterus undergoes certain changes of position which must not be considered pathological—viz. :

(1) During inspiration the pelvic floor descends, owing to increased abdominal pressure and descent of the diaphragm. This can be well observed by inserting a Sims's speculum and observing the anterior vaginal wall: the converse occurs during expiration, while violent straining produces further bulging.

(2) A distended bladder pushes back the whole uterus (retroponation); it tends to retroversion of the fundus, and the intestines will be found pushed out of Douglas's pouch.

(3) Distension of the rectum pushes the uterus forwards (anteponation) and to the right.

General Considerations of the Pelvic Floor.

The pelvic floor may be considered as a diaphragm with three faults or slits in its under surface :

1. The urethral slit ;
2. The vaginal slit;
3. The anal slit.

The first and second have their long axes parallel to the plane of the pelvic brim: the former is governed by sphincteric action, and may be considered as closed, except during micturition or the passage of a catheter.

The anal slit runs at right angles to the pelvic brim, but being protected by a sphincter it must only be looked upon as a weak spot during the act of defecation (Fig. 17).

The vaginal slit or fault is of great importance; it may be considered as dividing the pelvic floor into two parts :

(1) **An Anterior or Pubic Segment**, consisting of—

1. The bladder and its peritoneal covering ;
2. The urethra joining it at right angles ;
3. Anterior vaginal wall ;
4. The retro-pubic fat (Fig. 16).

This segment is attached to the symphysis pubis *loosely*.

(2) **A Posterior or Sacral Segment**, composed of—

1. The posterior vaginal wall and the perineal body ;
2. The rectum ;
3. Tendinous and muscular tissue.

This is *firmly* attached to the coccyx and sacrum by a dove-tailing process around which it rotates.

During labour this latter is pushed down in front of the pre-

senting part, and distended, while the pubic segment is drawn up by the retraction of the uterus.

The peritoneum over the bladder is displaceable : over the sacral segment it is attached.

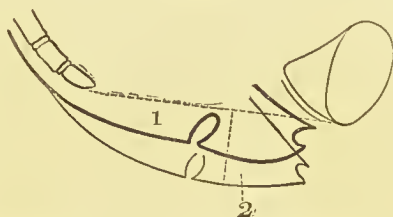
The *function* of the pelvic floor is to support the rectum and vagina, and the muscles are so arranged as to close their orifices when in action, except during defecation or parturition.

Projection of the Pelvic Floor.—This is best seen when a patient strains by closing the glottis and bearing down. It consists in a projection of the soft parts beyond an imaginary straight line joining the tip of the coccyx and the lower border of the symphysis pubis ; in other words, the conjugate of the outlet. (Fig. 20).

The amount of actual projection is represented by an arc the perpendicular of which is about 2.5 c.m. (1 inch nearly). The measurement of the arc, by a tape over the soft parts, is about 4 inches on the average ; on straining in a nulliparous woman, it may reach $4\frac{3}{4}$ inches. In excessive and pathological bulging it may be as much as 6 inches.

Stretching is chiefly confined to the parts behind the vaginal slit—*i.e.*, of the sacral segment.

FIG. 20.



The projection of the pelvic floor

(1) At rest (thick outline).

(2) During bearing-down effort (thin line).

(From a nullipara.)

(D) The Vascular, Lymphatic and Nervous Supply to the Pelvic Viscera.

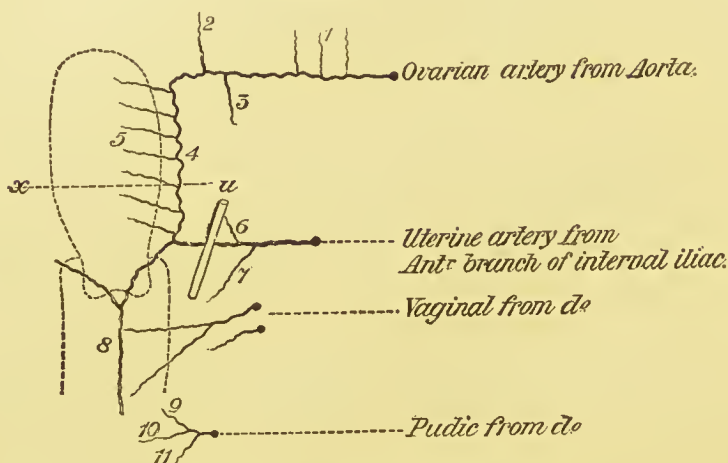
(i.) **The Arterial Supply** is mainly derived from the ovarian and uterine arteries. The *ovarian* arteries take their origin directly from the aorta : on reaching the pelvic brim, each one crosses in front of its corresponding external iliac artery, and then travels in a tortuous manner between the layers of the broad ligament, along its upper portion ; it sends off branches in its course to the ovary, the Fallopian tube, and the round ligament, and is continued as a large descending anastomotic trunk which joins a corresponding ascending branch from the uterine artery (Fig. 21).

The *uterine* artery on either side arises from the anterior branch of the internal iliac : each vessel passes downwards and inwards towards the cervix uteri, and in front of the ureter, giving off a branch to aid in forming with its fellow of the opposite

side the circular artery of the cervix (Fig. 15: 1): it then ascends close to the uterine wall and between the layers of the broad ligament, in a tortuous manner, sending off slightly oblique transverse branches to the uterine substance; it finally unites with the descending branch of the ovarian artery (Fig. 21).

The anterior branch of the internal iliac also gives off vesical branches to the bladder, vaginal to the vagina, a middle hæmorrhoidal and an internal pudic; this last is one of the terminal trunks and supplies the labia through the perineal artery, the

FIG. 21.



Schema of arterial supply to the uterus, appendages, vagina and vulva.
(Right broad ligament from behind.)

- | | |
|---|------------------------------------|
| u. Ureter, crossed by the uterine artery. | 6. Branch to ureter. |
| 1. Branches to the ovary. | 7. " bladder. |
| 2. " " Fallopian tube. | 8. Azygos vaginae. |
| 3. " " round ligament. | 9. Branch to labia. |
| 4. Anastomotic trunk. | 10. " bulbus vaginae. |
| 5. Oblique circular branches. | 11. Terminal branches to clitoris. |

bulbus vaginae through the artery of the bulb, and the clitoris by means of its terminal branches.

(ii.) **The Venous Supply** consists of several plexuses which open into the ovarian, internal iliac, or inferior cava veins; they are not provided with valves. The most important are:

(1) The *vaginal*, which opens into the internal iliac vein; (2) the *ovarian* or *pampiniform*, which lies between the layers of the broad ligament, and after communicating with the uterine plexus, empties its contents into the ovarian vein which on the right side enters directly into the inferior vena cava, and on the left opens

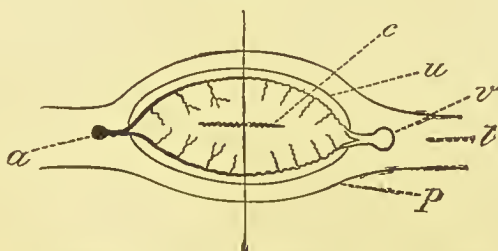
into the left renal vein; (3) the *hæmorrhoidal* and (4) the *vesical*, both terminating in the internal iliac vein. In addition, the broad ligament contains a very large series of plexuses which are in communication with all the above.

The arrangement of the arteries and veins above mentioned shows the important fact that accurate compression of the broad ligaments will absolutely control the circulation to the uterus and its appendages; this should be remembered in all operations entailing wounds of the broad ligaments, such as supra-vaginal amputation of the cervix, or in total extirpation of the uterus.

Any hæmorrhage from a lacerated vein may be very profuse, leading to the formation of a pelvic hæmatocele.

On the Course of the Arteries and Veins in the Uterus itself.—It has already been mentioned that two tortuous arterial trunks

FIG. 22.



A transverse section of the uterus at *x*, Fig. 21.

On the right hand is represented the venous circulation, on the left, the arterial.

- | | |
|---|--|
| <i>u</i> . Outline of uterine wall (posterior surface.) | <i>v</i> . Uterine plexus cut across. |
| <i>l</i> . Broad ligament. | <i>a</i> . Circular artery being given off from anastomotic trunk. |
| <i>p</i> . Peritoneum. | <i>c</i> . Uterine cavity cut across. |

run on either side of the uterus between the layers of the broad ligaments; these give off branches somewhat obliquely, which by anastomosing with those of the opposite side form circular arterial loops which can be compared to the blood-supply to the intestines (Fig. 22). This series of arterial circles lies just within the muscular tissue of the uterus, having the majority of the organ internal to it: from each is given off branches at right angles to the uterine surface, which break up into capillaries near the mucous membrane; the blood returns by venous trunks somewhat similarly arranged, emerging finally into the uterine plexuses; these again communicate with the vaginal and broad ligament plexuses and the ovarian veins.

This arrangement must be considered in treating of uterine flexions: from the various collateral methods of entry and escape

of the blood from the uterus, it is evident that little or no influence in the shape of retardation or arrest of the blood-current can take place, and that uterine congestion as a consequence of flexion of the body on the cervix is very improbable.

(iii.) **Lymphatics.**

- (1) Those of the external genitals and the lower third or fourth of the vagina open into the inguinal glands: hence any irritation about the pudendum, from specific sores, or malignant disease, would be attended by corresponding swelling of the glands in the groin.
- (2) The lymphatics of the upper two-thirds or three-fourths of the vagina, of the cervix and bladder, enter into the hypogastric or internal iliac glands.
- (3) The lymphatics of the uterus consist of a superficial and deep set: the former lie immediately beneath the peritoneum, the latter in the organ proper: they traverse the space between the layers of the broad ligaments, and after union with the lymphatics of the tubes and ovaries enter into the lumbar glands.
- (4) The lymphatics of the rectum run in the meso-rectum to the sacral glands.

The importance of these details in relation to sepsis from injuries to the genital canal is self-evident.

(iv.) **Nervous Supply.**—This is derived from (a) the spinal nerves; (β) the sympathetic system.

The spinal nerves are the third, fourth and fifth sacral, which, in addition to supplying the muscles of the pelvic diaphragm, send branches to the sympathetic plexuses.

The *pelvic* or *inferior hypogastric plexuses* are two in number, derived from the hypogastric plexus, and situated on the sides of the vagina and rectum; they receive spinal branches from the third and fourth sacral nerves.

From these plexuses are given off—

- (1) Rectal plexuses which run along the arteries to the rectum;
- (2) Uretric, to the lower portion of the ureters;
- (3) Vesical, to the bladder;
- (4) Vaginal;
- (5) Uterine;
- (6) Ovarian and Fallopian.

The vesical appears to receive a larger proportion of spinal nerve branches than do the others; the ovary obtains its chief supply from the sympathetic running along the ovarian artery.

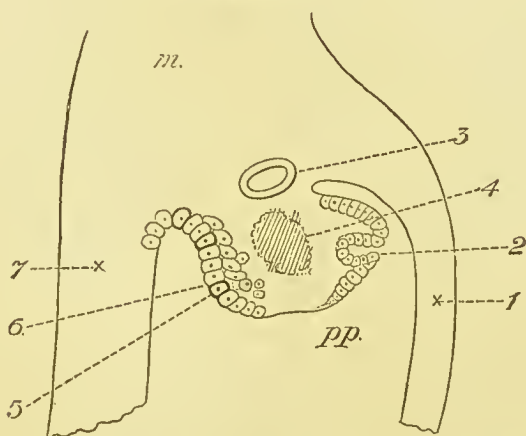
The uterine plexuses travel upon the vessels between the layers

of the broad ligaments, then leaving the arteries they sink into the muscular tissue, ending in the cervix and lower part of the uterine body. Their exact mode of termination is undecided.

(E) Development.

A brief description of the mode of development of the generative organs in the female is necessary to enable the student to better understand the origin of the pathological conditions to be described later: a certain knowledge of elementary embryology is taken for granted. The urinary and generative organs arise from

FIG. 23.



Development of genital organs. (Semi-diagrammatic.)

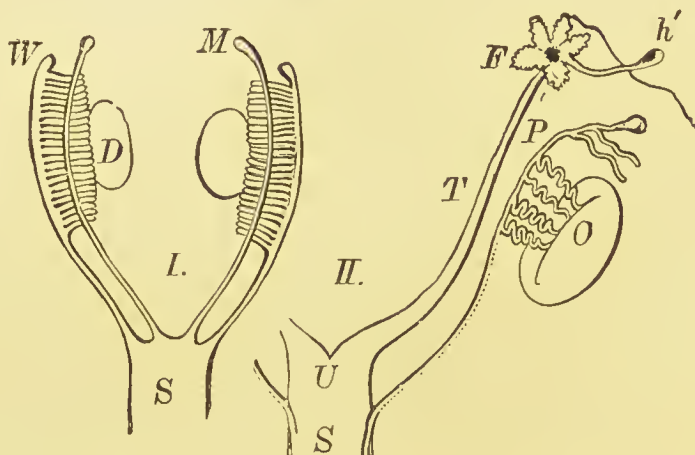
- | | |
|-------------------------------|--------------------------------------|
| 1. Somato-pleure. | 6. Germinal epithelium. |
| 2. Müllerian duct in section. | 7. Splanchno-pleure. |
| 3. Wolffian duct. | <i>m.</i> Mesoblast. |
| 4. „ body. | <i>pp.</i> Pleuro-peritoneal cavity. |
| 5. Primordial ovum. | |

a collection of mesoblast abutting on the pleuro-peritoneal cavity, called the *intermediate cell-mass*. The *Wolffian duct* first appears as a longitudinal canal on the outer portion of this mass, and is followed by the *Wolffian body*, of which it becomes the excretory duct: this body, which appears about the third or fourth month of foetal life, occupies a considerable portion of the intermediate cell-mass (Fig. 23), and consists of a number of transversely placed parallel tubes, their distal ends apparently opening into the peritoneal cavity, their proximal ends into the duct: those contained in the *anterior* portion elongate and become convoluted, ultimately forming the true kidney structure (glomeruli). The upper end of the Wolffian duct becomes closed, while the lower opens into a

urogenital sinus—*i.e.*, a cavity common to the urinary and generative functions.

External to the Wolffian duet and parallel with it the epithelium becomes thickened and invaginates (Fig. 23 : 2), ultimately forming a tube, the *Müllerian duct*: its distal or upper end opens freely into the pleuro-peritoneal cavity, while the lower enters the urogenital sinus. Later, it unites with its fellow of the opposite side to form a single tube before entering the sinus (Fig. 24: *II*, *U*).

FIG. 24.



Development of the internal generative organs.

I. Undifferentiated condition.

D. Reproductive gland, lying on the tubules of the Wolffian body.
W. Wolffian duct. *M.* Müllerian duct. *S.* Urogenital sinus.

II. Transformations in the female.

F. Fimbria, with the hydatid *h'*. *T.* Fallopian tube.
U. Uterus. *S.* Urogenital sinus. *O.* Ovary.
P. Parovarium. (From Landois & Stirling's *Physiology*.)

Gärtner's duct (dotted line *II*.) is seen entering the urogenital sinus.

On the inner side of the projection formed by the Wolffian body is produced a thickened layer of germinal epithelium (Fig. 23 : 6), the cells being columnar in shape; scattered through these are larger cells, the so-called *primordial ova* (Fig. 23 : 5). This layer lies over the mesoblast, and processes of the germinal epithelium grow down into it, forming tubes containing ova. In this way the ovary is produced: it will be seen that this organ and the Müllerian duet (the future Fallopian tube) arise on opposite sides of the intermediate cell-mass.

Subsequent Changes in the Wolffian Bodies.—The remaining tubules of which the *posterior* portion of the Wolffian body is composed, almost entirely atrophy; a few, however, remain, to the number of from nine to fifteen, and form the *parovarium* or organ of Rosenmüller. The Wolffian duct becomes closed and remains as a cord (*Gürtner's duct*) running between the layers of the broad ligament, and it has been traced through the uterine and vaginal walls; under certain conditions, however, portions of it may remain patent, dilate, and form cysts. If one of the tubes of the parovarium is affected we get a parovarian cyst; if that portion which lies between the parovarium and the uterus is dilated we have a broad ligament cyst; cervical and vaginal cysts are probably derived in a similar manner (Fig. 24).

Subsequent Changes in the Müllerian Ducts.—The portion formed by the union of their lower ends develops into the uterus;

FIG. 25.



FIG. 26.



Figures 25, 26, 27, 28 are illustrative of the various stages in the development of the female genitalia (Schroeder).

ALL, The allantois; M, Müller's duct; R, Rectum; A, Depression of future anus; CL, Cloaca; C, Clitoris; B, Bladder; U, Urethra; V, Vagina; SU, S, Sinus urogenitalis.

the upper or distal end of each remains patent, still communicating with the peritoneal cavity; the edges of the tube become divided into fimbriæ, the end assuming a trumpet shape; this is the Fallopian tube (see *II.* Fig. 24). One of the fimbriæ often has a hydatid developed at its distal extremity (*h'*).

The site of the passage of the united Müllerian ducts into the urogenital sinus becomes the vagina. It is found that from the third to the fourth month of foetal life there is no distinction into vagina and uterus, but that this occurs from the fifth to the sixth month.

There is a slight descent of the ovaries, corresponding to that of the testis in the male, the round ligament being the analogue of the gubernaculum testis. This will account for the occasional passage of the ovaries through the external abdominal ring, and even into the external labium.

External changes, resulting in the formation of the pudendum,

perineum, anus and vagina occur as follows:—Between the second and third month of foetal life the rectum, allantois, and Müllerian ducts are all in communication; there is, however, no external opening—*i.e.*, both anus and vulva are absent; this condition is represented diagrammatically in Fig. 25. About the end of the third month the genital cleft appears; this becomes more marked, and finally communicates with the common cavity already mentioned; a *cloaca* or common opening for the rectum and urogenitalia is thus produced (Fig. 26).

The upper part of the allantois becomes the urachus, the lower the bladder (Fig. 27). The perineum is formed by that tissue which exists between the rectum and allantois pushing itself down and dividing the cloaca into an anterior and posterior chamber by a

FIG. 27.

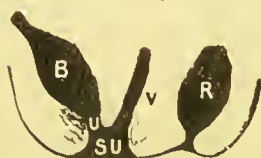


FIG. 28.



transverse partition: this ultimately becomes the *perineal body*, while the anterior cavity is the urogenital sinus already mentioned, and the posterior the *anus* (Fig. 27). The lowest part of the allantois contracts and forms the neck of the bladder, while the upper portion of the urogenital sinus gives rise to the *urethra*, the lower to the *vestibule*.

The *labia minora* are simply the edges of the genital cleft, and the *clitoris* is the remnant of the genital eminence, a process which appears at the sixth week in front of the cloaca (Fig. 28).

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CHAPTER II.

ON THE METHOD OF TAKING A CASE.

Two means are at our disposal to attain this end : first, the facts ascertained from the patient's narrative and answers to questions asked her ; secondly, the physical signs which we find existent, and which may be included under the term *present condition*. First of all, the patient's name, address, age, and occupation should be accurately recorded, and especially with regard to the last, for those pursuits which entail much pelvic movement, such as sewing-machine work, or close confinement to rooms, as among milliners and artificial flower workers, may have an important bearing on the patient's illness.

A. Mode of Interrogation.—The patient should then be interrogated as follows:—Are you married, single, or a widow ? If married, for how long ? Have you any children ? If so, when was the last born ? Have you had any miscarriages ? If so, at what date of pregnancy did they occur ? Have they occurred since the birth of the last child or before ? What was their presumed cause ? Assuming that the patient has had children, the history of the labour and lying-in of *each* confinement must be accurately inquired into. Such items as instrumental delivery, perineal laceration, subsequent tender and swollen abdomen, shivering, and prolonged lying-in period, being especially facts to be inquired about.

Having so far obtained her antecedent history, you will proceed to ask the patient to detail her symptoms.

From what time do you date your illness?—N.B. *Beware of asking leading questions. Nothing is more likely to lead to a false conception of the case.*

Having noted down the symptoms as detailed by the patient, the question of menstruation arises. When did the monthly periods or “poorly” times first appear in your life ? Have they always been regular ? How many days clear interval as a rule have you ? *This question is necessary, owing to the fact that a woman will say she is regular when she has much less interval than twenty-one days.*

Proceeding: How many days does the flow last? Is it copious or scanty? and on what day is the greatest loss? *The question of quantity lost is a very difficult one to gauge accurately; and the only definite way which the author has found of any value is by inquiring into the number of diapers used in the twenty-four hours. If a poor woman is compelled to change four or more times in twenty-four hours, the loss may fairly be considered as very copious. Among patients in the more comfortable class this would not be considered excessive.*

Is the "poorly" time accompanied by any pain? If so, does it occur before the onset of the flow or is it coincident with it? Does it arise on the second or third days or is it subsequent to the cessation of the discharge? Where is the site of the pain? *It will usually be found on inquiry that the three principal sites are—over the base or tip of the sacrum (sacralgia), across the lower abdomen, and down the inner side of the thighs. The pain may be cutting, stabbing, boring, or grinding in nature.*

Is the flow accompanied by swelling and tenderness of the abdomen? Have you noticed any change in the character of your "poorly" times since marriage, either in pain, quantity, or duration? Has any change occurred since the birth of any of your children? and in what way is it altered? At present, is the discharge a good colour? Do you pass shreds or clots with the discharge? Is the cessation of flow followed or preceded by leucorrhœa, and does it continue during the whole interval? Inquiry should now be made as to whether menstruation has been changed in any way by the advent of her present illness.

Is there any trouble with the bowels—namely, constipation, diarrhœa, pain during defecation (*dyschezia*) or after (*query, possibly fissura ani*)? Have you lost blood during defecation (*query, hæmorrhoids*)?

Is the urine passed naturally? If not, is there pain before, during, or immediately after the act of micturition? Do you have to pass it often in the day? and how often do you get up at night?

The irritation often present in the early months of pregnancy, and with a large retroverted uterus, whether pregnant or not, may be present.

Cystitis is accompanied by the passage of turbid urine, and should be distinguished from those cases in which the urine is passed clear and becomes turbid on standing—due to the presence of urates.

Is there pain during sexual intercourse (*dyspareunia*), and is it during the act or after?

Are you losing flesh? if so, rapidly or slowly?

General questions should be directed to the digestive and other functions. Family history and history of previous illnesses should be inquired into.

B. Present Condition.—Note the manner in which the patient walks into the room: whether erect or stooping, whether she is stout or thin, fresh-coloured or pale, and whether her face betokens presence of pain or not; and if any distinctive odour emanates from her person. Should suspicion be raised by her general appearance of the existence of fever, take her temperature with a thermometer. No accurate value can be paid to the pulse, which the excitement of the interview usually increases in rate.

Our methods of exploration are four in number.

I. Examination of the abdomen, more particularly directed to the hypogastrium and iliac fossæ—*per hypogastrium*.

II. Examination by the vagina—*per vaginam*.

III. Examination by the rectum—*per rectum*.

IV. Examination by the bladder.

I. Examination of the Abdomen.

First, the patient having all her clothes loosened, the stays undone, and nothing between the examiner's hand and the abdominal wall but the linen, should be placed on a couch on her back in a semi-recumbent position. Every effort should be directed to distract the patient's attention from the examination of the abdomen, which must now be carried out by means of inspection, percussion, superficial (or surface) and deep palpation, and auscultation.

For convenience of recording the case the abdomen is divided into certain areas—hypogastric, iliac, umbilical, &c.

(1) **Inspection.**—Is the abdomen really enlarged or not by a uterine or other swelling? Abnormal adipose tissue in the abdominal walls and distension from flatus give to the eye the idea of enlargement. The *surface* should be examined for the presence or not of shining white lines; these are usually arranged in a circular manner around the umbilicus, and are most marked below its level where they become parallel to Poupart's ligament. They are due to over-stretching of the abdominal parietes, and hence pregnancy is the most common cause; but it must not be concluded from their presence that pregnancy has existed, as the over-distension from ovarian tumour, ascites, and excessive adipose deposit may similarly cause them. They are also seen on the breasts and thighs.

Umbilicus: whether it is situated in the median line, and nearer the xiphoid cartilage or pubes, should be ascertained.

Whether it is depressed, flush with the surrounding surface, or projecting; wrinkled or smooth; if discharge is seen issuing from its deeper surface. From the umbilicus to the symphysis pubis a line of pigment is often present, especially in brunettes, and is deepened with the existence of pregnancy.

Shape of the Abdomen: does it project anteriorly, or laterally? If the former, the tumour is generally a solid one or in connection with the uterus or either ovary; if there is bilateral bulging, possibly ascites is the cause. Observe whether there are any enlarged veins, running either towards the costal cartilages or Poupert's ligament.

It will be convenient now to examine **the breasts** without disturbing the patient's position. The breasts may vary from almost entire absence to great hypertrophy, this latter condition being due either to excess of fat or to considerable development of the true secreting tissue or both. The appearances will vary according to the complexion of the patient, whether she be blonde or brunette.

Signs to be looked for.—Enlarged veins, passing from the nipple towards the clavicle in a sinuous manner; white lines radiating from the areola; nipples, whether projecting, flattened, or depressed below the surface; primary areola, more marked in the brunette than the blonde; the amount of pigmentation present, whether Montgomery's cups or follicles on its surface are enlarged and projecting; if moisture exist at the base of either nipple; or whether a serous secretion can be expressed from them by squeezing the glands; if so, a yellowish scaly material will be usually found on their apices, and the linen may be stained at the sites of contact. The fluid, which is usually serous but may be milky, is of great value in the *nulliparous woman*, for, if present in addition to amenorrhœa, it strongly points to the existence of pregnancy. In a *parous woman*, on the other hand, and especially where lactation has been performed, it is quite valueless, as after the mammary function has once been excited by suckling, a certain amount of clear or opalescent fluid may always be expressed. Observe whether a secondary areola is present.*

(2) **Percussion.**—This should be performed in the usual way, and particular attention paid to the supra-pubic or hypogastric region, the right and left iliac fossæ, the flanks, and the surface about the umbilicus. The first is of importance, because it is in that situation that uterine enlargements are first felt cropping up above the brim of the pelvis, and where the distended bladder is first detected. Should the flanks be resonant, the absence of fluid

* A description of the secondary areola of pregnancy will be found in any text-book on Midwifery, under "Mammary Changes" in pregnancy.

in the peritoneal cavity to any large extent may be considered as probable. If, however, dulness is present in both flanks, the patient should be told to turn on to her side; if the *elevated* flank give a resonant note on percussion, fluid in a free state and in some quantity is probably existent in the peritoneal cavity. If a dull note is still elicited on percussion, then the fluid is either encysted or possibly a renal tumour may be present. The ascending, transverse, and descending colon usually give, if fairly distended, a tympanitic note, and can easily be mapped out on the abdominal surface.

(3) **Palpation** should be performed lightly with both hands, the pulp of the extended fingers being always used in preference to their tips. The reasons for this are twofold: much more sensitiveness is present in the pulps, and the pain given to the patient is less. It is needless to say that the patient's attention must be distracted as much as possible, and her alarm pacified during the performance of palpation. Opening the mouth wide, taking a deep inspiration, and expiring gently and slowly are two practical methods of reducing rigidity of the abdominal wall.

Facts to be ascertained by Palpation—(a) The presence or not of pain, and whether it is surface or deeper tenderness. This is surrounded with great difficulties. In hysterical women the mere palpation of either iliac fossa will produce apparent symptoms of pain. If the operator's hands are cold, real surface pain is produced.

(b) The presence of any swelling, its apparent site of origin—that is to say, whether it arises in the hypogastric, iliac, or lumbar regions.

(c) The characters of the swelling; whether it is mobile or fixed, smooth on its surface or nodular; its shape, whether round or oval; whether on light friction over the abdominal surface rhythmic contractions and relaxations are felt; if at intervals, irregular movements can be detected. These two latter are absolutely distinctive of pregnancy. It must be remembered that percussion and palpation, although described separately here, may be carried out together.

(d) Separation of the recti: this may be congenital or be a result of abdominal section; in extreme cases the majority of the intestines protrude through the cleft, forming a large ventral hernia. This accident through the site of an operation wound is unfortunately not uncommon. The condition is diagnosed by placing the fingers between the cleft, with the woman in the semi-recumbent position, then telling her to try to sit up. Immediately the recti are put into action, and their inner edges come into close apposition, nipping the examining fingers. The

original condition is reverted to on the patient resuming her former posture.

Examine the groins and their neighbourhood, more particularly for the presence of swollen glands, hernia (inguinal or femoral), or an abnormally situated ovary.

4. **Auscultation.**—This is negative evidence except where we have, first, a large uterine fibroid tumour, and where the blood-vessels are often of enormous size; and secondly, in normal (*i.e.*, intra-uterine) pregnancy; and thirdly, in abnormal (or extra-uterine) pregnancy. The sounds which can be detected over an enlarged fibroid are of the nature of the uterine souffle and synchronous with the maternal pulse. This souffle is produced in the large vessels running in the uterine wall. It is said to be most audible on the right and left sides. The sounds which may be heard over the pregnant uterus are three: (*a*) fetal heart sounds, (*b*) the uterine souffle, (*c*) the umbilical souffle. For a full description of these sounds and their mode of differentiation, reference must be made to a work on Midwifery.

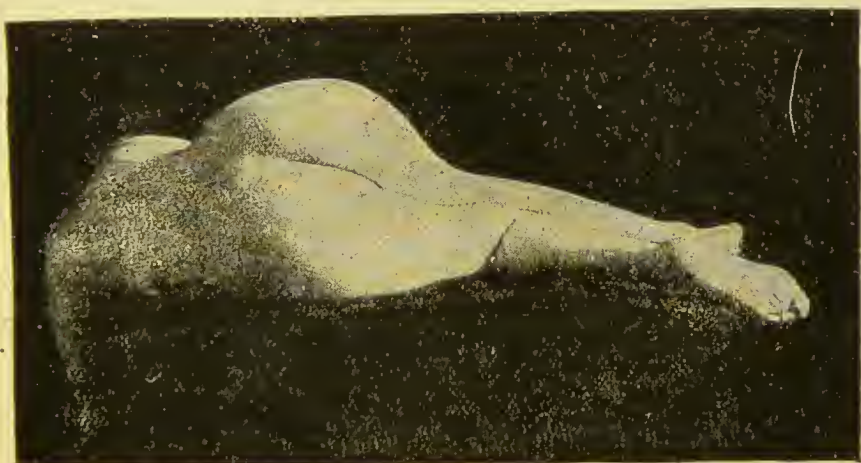
II. Examination per Vaginam.

This may be performed with the patient in two positions: (*a*) *the left lateral decubitus*, or what is commonly known as Sims's position; and (*b*) *the dorsal decubitus*, in use in America and on the Continent.

(*a*) **The Left Lateral.**—The woman lies on her left side with her body across the examining couch, the buttocks at or hanging over the edge and towards the operator, the legs being drawn up towards the abdomen, the right knee higher than the left, so that the inner surface of the former rests upon the couch. The head should be only slightly raised by a flat pillow; the left arm being brought underneath the body backwards, hangs loosely over the same side of the couch as the buttocks; the woman will thus lie on her left shoulder and breast, and there is also an obliquity of the posterior surface of the sacrum to the horizon. This produces a torsion of the body on the hips (Fig. 29). The skirts being well pushed up to the waist, or dropped below the knees, and the hips being covered by a sheet, the index-finger of the right hand is dipped into carbolic oil, carbolised vaseline, or some antiseptic unguent. The patient should now be asked whether she is tender "outside"—*i.e.*, whether the vulva is sore. If this is the case, it is probably better to expose the parts and then make the examination, otherwise this should be done under the linnen sheet. The oiled finger with the nail *carefully* pared, should impinge on the anterior edge of the perineum and passing forwards enter the vagina.

Another method, which seems less preferable, consists in starting from the lower surface of the symphysis pubis, gradually gliding backwards over the clitoris and urethral orifice, past the anterior attachment of the hymen (if present) and so into the vagina. Great care must be taken to avoid hurting the patient by too strong pressure on the sensitive surface near the urethra. It is needless to add that the finger-nail should neither be long nor ragged. Most authorities use the right hand habitually for examination per vaginam, a few use the left, some again are fortunate enough to be ambidextrous; and it is well for the student, if right-handed, to practise examination with his left, and *vice versa*. This is of importance, because the woman may be suffering from a specific sore, and the operator having perhaps

FIG. 29.



Patient in the left lateral decubitus (Cadaver).

a small fissure or excoriation on his examining finger, is not unlikely to become infected; or again, the patient may have a septic discharge, and the examiner being in attendance at the time on a case of labour, it would be most unjustifiable of him to examine both with the same finger, if other means were possible.

Facts elicited by Vaginal Examination: (a) **Vulva.**—If the vulval orifice is painful, the woman will probably cry out and straighten out her legs; the vulval orifice thus becomes moved almost between the thighs, and so prevents anything satisfactory being made out. Such conditions would be caused by vaginitis, vulvo-vaginal abscess, labial specific sore, urethral caruncle, or occasionally the pulling on one of the tender hairs about the vulval orifice by the finger of the careless examiner. If the

internal labia are pendulous, one or both may be pushed in front of the finger and so obstruct the orifice. The vulval opening may be patulous, as after recent labour, or from a lacerated perineum, or it may be narrow and examination difficult.

(b) **Vagina.**—The finger now passes backwards and upwards, and notes the condition of the mucous membrane of the vagina, whether moist or dry, hot or cool, smooth or rugose (wrinkled); whether the anterior wall is tender, as in acute or chronic cystitis, or the posterior wall, as in inflammation of the rectum (proctitis). The vagina is usually contracted and short in old women. Presence or the reverse of cicatricial tissue must be noted. Foreign bodies in the vagina—*e.g.*, pessaries of vulcanite, india-rubber, or glass, and a variety of others may be found occupying the vaginal cavity. Notice whether any growth is projecting into the vaginal roof, or if the mucous membrane is covered with raised papules or nodules which may sometimes indicate the presence of sarcoma. As the finger travels still further backwards, the cervix will be found projecting more or less from the vaginal roof. Notice whether it is centrally placed or whether laterally displaced. In front and behind this are the anterior and posterior cul-de-sacs: observe the depth of these, and whether occupied by any solid mass. Scybala in the rectum may so encroach on the vaginal cavity as to make an enema necessary before a satisfactory examination can be carried out.

(c) **Cervix.**—Note the length of the vaginal portion of the cervix—*i.e.*, how much it projects into the vaginal cavity; whether it is conical and long, or short and obtuse. Notice the direction in which the external os uteri points, whether forward, backward, or laterally. The normal direction is downwards and backwards, and nearly at right angles to the plane of the inlet of the pelvis. To the touch it somewhat resembles nasal cartilage.

The External Os Uteri: whether soft or hard, smooth or irregular, patulous (open) or closed. In healthy nulliparous women its shape and size cannot be made out by touch alone: it conveys to the examiner the idea of a shallow concavity; but in a multipara the aperture may be about half an inch across, and admit the tip of the finger easily. In women who have passed through an artificial or natural menopause, the vaginal portion of the cervix tends to atrophy, and what was formerly a projection becomes nearly flush with the vaginal roof. Remark if any mass is presenting at the external os uteri, as a cervical polypus or malignant growth.

Cervical Lacerations.—These are the result of normal labour, or of one which may have been too rapid, or the forceps applied before complete thinning and dilatation of the cervical tissue has

taken place. They may be superficial or deep: in the former case, and when several are present, a peculiar irregular and nodular sensation is imparted to the examining finger.

The deep lacerations extend more or less up to the vaginal roof, and are usually situated laterally—either singly, or one on either side; they may also be arranged in a stellate manner.

The hardness and irregularity of commencing malignant disease of the cervix must also be borne in mind.

Observe whether on withdrawing the finger it is blood-stained, or has an offensive smell. Hæmorrhage usually occurs most easily with commencing malignant disease, and is therefore a valuable sign. The odour of breaking down malignant tissue is a most unmistakable and disagreeable one; it is, moreover, very tenacious.

Now tell the woman to bear down. By this means any abnormal descent of the uterus or of the anterior or posterior vaginal wall is detected, and any swelling of the ovaries more clearly defined.

By pressing strongly backwards towards the rectum, eversion of its mucous membrane can be produced, and its healthy or pathological state noted.

Abdomino-Vaginal or Bimanual Examination.

The patient may be in the dorsal or left lateral decubitus. In the author's experience the former should be used as an adjunct to, and after, the latter. With the woman in the left lateral position and the right forefinger in the vagina, the contents of the pelvis can, so to speak, be palpated between the hands. The left hand should be applied with its *palmar* surface to the abdomen, and parallel with the plane of the inlet, the greatest pressure being made with the ulnar surface of the hand. Before proceeding further, ask the woman when she last passed her water. If not for some hours, she should be asked to pass it, or the catheter used. The primary object of bimanual palpation is to make out the exact locality and size of the uterus. The forefinger of the right hand being passed into the anterior cul-de-sac and the left hand (in the position already described) just above the symphysis pubis, alternate pressure from below upwards with the right hand, and from above downwards with the left hand, will give to the operator a sensation in a normally situated uterus of something solid intervening between the two hands, in addition to the abdominal parietes. This is the fundus uteri. It should be carefully noticed that the index-finger of the right hand must not be placed too much anterior to the cervix, or the fundus uteri may become pushed backwards by the combined pressure of the

hands. An absence of the fundus uteri in the anterior cul-de-sac would lead us to suppose that the uterus was not in its normal situation. The finger in the vagina should now be carried backwards into the posterior cul-de-sac, and deeper pressure made with the ulnar surface of the left hand. Note must be made as to the presence or absence of a swelling there; its shape, whether with a smooth or irregular surface, tender or painless, fixed or mobile; the outline of the sacro-uterine ligaments should be defined if possible, and whether they are rigid or lax. Passing the index-finger into the right and left fornices (*i.e.*, that part of the roof of the vagina which lies at the base of the broad ligament on either side) and the left hand into the right and left iliac fossæ successively, the condition of the broad ligaments, whether healthy or not, and if occupied by any morbid material, can be satisfactorily cleared up. Either ovary if enlarged or tender can be made out just posterior to the broad ligament of its own side. Healthy ovaries, if normally situated and of average size, cannot as a rule be felt in the bimanual examination.

Having verified the situation of the uterus it is important to ascertain whether it is mobile, and if so whether freely or partially. This is not so easy to define as at first appears. It is usually recommended to push the cervix backwards and forwards, but the cervix itself may often move, and the body of the uterus not. Partial fixation is due to some interference with the action of the broad ligaments, and the uterus is therefore often partially fixed to the right or to the left side. The surface of the uterine body must be mapped out as much as the thickness of the abdominal walls will allow; the slight globular enlargement of early pregnancy, a fibroid outgrowth, or any other irregularity can be thus detected. The patient should now be turned on to her back, the nates brought to the foot of the couch, and bimanual examination carried out as before.

To examine the condition of the ovaries this decubitus is the best: rotation of the thighs outwards should be performed, thus putting the psoas muscle on either side on the stretch: its inner border is the guide to the position of the ovary. If either be enlarged, detection is very easy.

Cases in which Bimanual Examination will be found difficult.

- (1) Where the abdominal walls are excessively thickened by adipose deposit.
- (2) In hysterical and neurotic women who persistently maintain rigidity of the abdominal parietes.
- (3) Where marked abdominal tenderness from the presence of

localised peritonitis prevents firm pressure by the left hand. It is usual to contra-indicate resort to this method in advanced pelvic cancer and acute inflammation. The most advantageous case to examine bimanually is the thin, recently confined (about three weeks) woman. Here we have a lax abdominal wall, an enlarged uterus, and distensible vaginal canal.

Inspection of the Vulva should now be performed either in the dorsal or left lateral decubitus: any discharge must be wiped away with cotton-wool, and the labial surfaces examined; a pocket magnifying glass will often be of great assistance in the inspection of tender spots, red patches, and inflamed orifices of Bartholin's or Skene's glands.

So far our examination has been performed without artificial aid; as adjuncts we are accustomed to resort to the use of certain instruments, viz.:

- i. The Uterine Sound.
- ii. Sims's Speculum.
- iii. Neugebauer's Speculum.
- iv. Fergusson's Speculum.
- v. Tenaculum.
- vi. Gum-elastic Catheter.

These are all that are necessary in ordinary examination for pelvic disease.

(i.) *The Sound* is a rod of flexible copper about 12 inches long—including the handle—and nickel-plated. It must not be made too fragile and yielding, but at the same time it should be sufficiently flexible to be bent by the operator's finger and thumb. It consists of a handle and stem, the anterior surface of the former being roughened to distinguish it. The distal end of the stem is bulbous to prevent perforation of the uterine walls. Two and a half inches from this is a small projection which marks the normal length of the uterine cavity, and what may be called the intra-uterine part of the stem: it is attached at about an angle of 160° to the extra-uterine portion, which is divided by small depressions an inch apart (Fig. 30). The length of the uterine cavity up to seven and a half inches can thus be measured. In Simpson's original sound another depression was made an inch and a half from the bulbous extremity. This appears to have no special advantage, and only weakens the intra-uterine portion of the instrument. Many modifications of the sound have been made, both as regards shape and material, but they are of so little importance that no mention will be made of them

FIG. 30.

The
uterine
sound.

here. Too frequent and habitual use of the sound cannot be sufficiently deprecated, and it will be found that as the practitioner becomes more skilled in the bimanual examination, his resort to the sound as an instrument of diagnosis will become correspondingly less frequent. It is the author's experience that the majority of ordinary female pelvic ailments can be diagnosed without its use.

Circumstances under which the Sound should never be Passed.—(1) During an ordinary and normal catamenial period.

(2) Where a history of recent pelvic peritonitis or cellulitis has been obtained.

(3) If, in addition to the above, either both or one ovary is tender and fixed, or prolapsed into Douglas's pouch.

(4) If malignant disease of the uterine body or cervix be present.

(5) If there is a history of the missing of a period. This is open to one exception—viz., when an ectopic gestation is suspected, and a knowledge of the size of the uterus is absolutely essential to make a correct diagnosis.

Facts learned by the Use of the Sound.—(1) The length of the uterine cavity.

(2) The direction of the uterine axis—forward, backwards, or to one side.

(3) The relation of the axis of the body to that of the cervix—anteflexion, retroflexion, lateriflexion.

(4) The condition of the endometrium—whether roughened or smooth.

(5) Whether any pain is produced by the passage of the bulb of the sound through the external os uteri or by pressure at the fundus, as in metritis and endometritis. Should there be difficulty in *withdrawing* the bulbous end through the internal os uteri, the presence of stenosis at that site is indicated.

(6) Whether the uterus is mobile or not.

(7) Whether a tumour presenting at the external os uteri is a polypus or an inverted fundus.

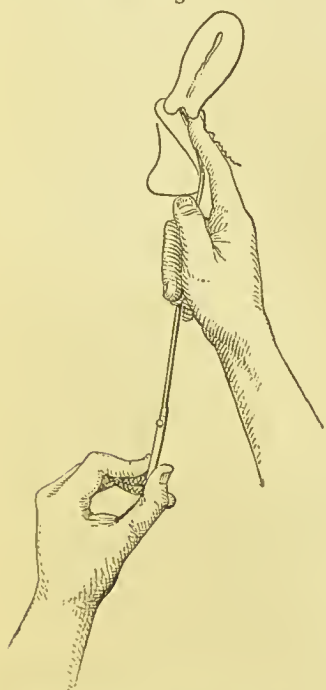
How to Pass the Sound.—Before passing this instrument it must be remembered that it may carry on its surface into the uterine cavity septic matter from a previous case. It is necessary therefore to thoroughly disinfect it. This is best done by passing it three or four times slowly through the flame of a spirit lamp, or by holding it a few seconds in a 1 in 20 solution of carbolic acid. When possible, especially if a purulent or offensive discharge is present, administer an antiseptic douche.*

The index-finger of the right hand should be passed into the vagina, up to the anterior lip of the cervix: the sound is

* The vagina of the healthy female should be considered as an aseptic cavity.

then taken in the left hand, with its concavity backwards, and the bulbous end slid gently along the palmar surface of the finger already in the vagina, until it reaches the os uteri, into which it should be passed for about a quarter of an inch, being, so to speak, moored there. The sound must now be steadied by the thumb and the two distal joints of the second finger of the right hand, and its subsequent movements controlled by the left (Fig. 31).

FIG. 31.



Method of passing the sound (1st stage).

Insertion of bulbous extremity into external os uteri. (From a photograph.)

FIG. 32.



Method of passing the sound (2nd stage).

Commencement of rotation forward of the handle: rough surface looks upwards. (From a photograph.)

The further passage of the sound into the uterine cavity depends on whether that organ is retroverted or anteverted; if the former, by passing the handle of the sound forwards, at the same time giving an upward and backward pressure to the bulbous end, the right hand steadying the sound as before, it will gradually pass into the uterine cavity; the smooth surface of the handle will be found to be anterior. If, on the other hand, the uterus is anteverted, a somewhat more complicated manœuvre is necessary (Fig. 32). The left hand taking the handle as before, passes

through an arc of a circle, by raising the handle and passing it forward until it lies beneath the symphysis pubis and between the external labia anteriorly. The rough surface of the handle will look first upwards, then forwards (Fig. 33). This resembles the *tour-de-maitre* in passing the male catheter. It is wrong and dangerous to attempt to rotate the sound on the long axis of its stem.

The bulbous end is now at the internal os uteri; bring the handle directly back to the perineum, and it will gradually glide into the uterine cavity (Fig. 34).

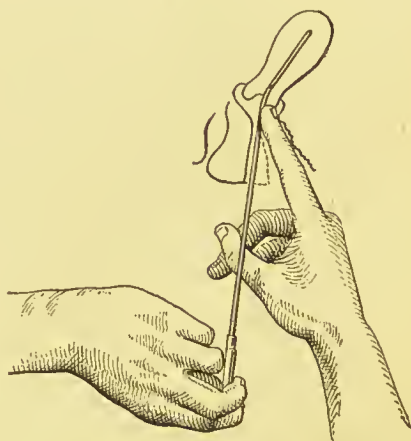
FIG. 33.



Method of passing the sound
(3rd stage).

Left hand carrying handle forward above right hand, finishing anterior rotation. (From a photograph.)

FIG. 34.



Method of passing the sound
(Last stage).

Left hand draws handle directly backwards: the perineum is retracted, and by slight upward pressure the sound passes into the uterus. (From a photograph.)

Difficult Conditions for Passage of the Sound: (1) Acutely anteflexed uterus. Here the cervix should be pulled down by a tenaculum, and the fundus pushed up by the examining finger. The canal is thus straightened. Another method consists in bending the sound to the shape of the anteflexed uterus.

(2) Spasmodic stenosis of the internal os uteri. In many cases, immediately the bulb of the sound touches the internal os uteri considerable pain is experienced. If firm pressure be exerted against the contracted opening, it will usually give way and the sound pass by.

(3) A submucous or other fibroid may alter the shape of the cervical and uterine cavity by projection into it. Force should not be used in these cases, but an ordinary solid rubber bougie be employed in place of the stiff sound.

(4) Cases in which the os uteri externum is contracted. In this condition the best method is to pass a Sims's speculum—presently to be described—and thus expose the cervix, then to introduce the sound.

Conditions in which the Sound shows the Uterine Cavity enlarged.—(1) Subinvolution, especially after abortion;

(2) In all parous women (about a quarter of an inch or more);

(3) In fibroids, whether submucous or interstitial;

(4) Endometritis;

(5) Malignant disease of the uterine body;

(6) In extra-uterine gestation.

Conditions in which the Uterine Cavity is diminished in Length: (1) Congenitally small uterus;

(2) The atrophied uterus of old age, and after the menopause;

(3) In super-involution.

Dangers of Passing the Sound.—(1) The induction of abortion in an early pregnancy;

(2) Sudden faintness, from the passage of the sound through a spasmodic stricture of the internal os uteri or over an exceedingly tender surface at that spot;

(3) Perforation of the uterine wall, especially if softened by malignant disease, or during the puerperium;

(4) The carrying of septic matter into the uterine cavity, and absorption through any abrasion already existent, producing peritonitis or pelvic cellulitis.

(ii.) *Sims's Speculum* consists of two single differently sized specula placed at right angles to, and united by, a solid cross-piece or handle. The former are called the blades. They should be relatively $4\frac{1}{4}$ and $3\frac{1}{2}$ inches in length, with the surface concave, but not too deeply so (Fig. 35).

How to insert Sims's Speculum.—The patient should be in the left lateral position, with the head low. The speculum must be dipped into hot water, and applied for a moment to the cheek as a test of its temperature. The convex surface only should be oiled, the concave being kept dry and bright for reflection.

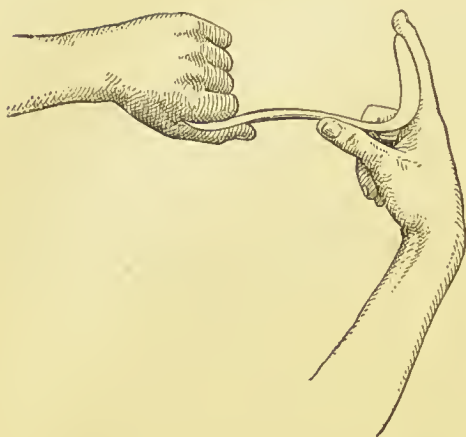
The instrument is passed in the following way, the smaller

FIG. 35.



Sims's duckbill speculum.

FIG. 36.

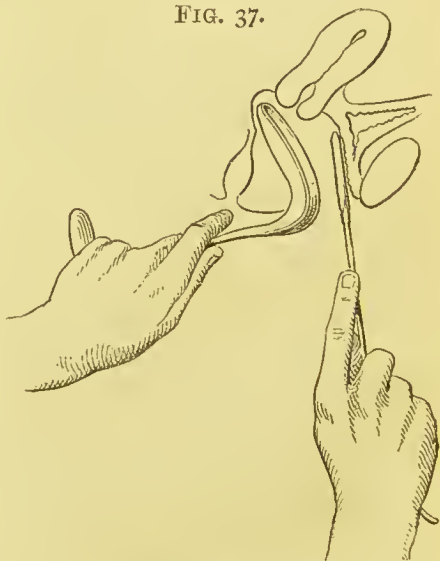


Position of the hands on the duckbill speculum immediately preceding and during the act of passing it into the vagina. (From a photograph.)

blade being selected as a rule unless the vagina is markedly patulous. The index-finger of the right hand is laid in the concave surface of the blade, half the top joint projecting above its upper rim; the second finger and thumb should overlap the handle to give support. The larger blade must now be grasped in the left hand, the four fingers encircling the blade, the thumb fitting into the concavity on the handle, with its palmar surface resting on the metal (Fig. 36). The smaller blade is now passed, as in an ordinary examina-

tion. It should be noted that the upper edge of the blade must lie in the posterior cul-de-sac; it is very apt to slip in front of the cervix. It will thus be seen that on pulling with the left hand directly backwards the perineum and "sacral segment" are retracted, and the vulval orifice widely opened, admitting air. Choice of the various methods of holding the speculum-blade with the left hand is immaterial. Often the anterior vaginal wall will be found to drop backwards into the speculum, and to hide the cervix from view. This can be remedied by pressure forwards of the right index-finger or by the use of the handle of the inverted sound (Fig. 37). The cervix, in its natural position and appearance, will now be seen.

FIG. 37.



Mode of exposing the cervix by pressure forward of the handle of the sound on the anterior vaginal wall, and retraction of the perineum. (From a photograph.)

What is to be observed through Sims's Speculum.—(1) The cervix, whether lacerated or entire; whether the os uteri is a small transverse slit or "pin-hole"; whether any granular "erosion," specific or malignant ulcer, or villous growth occupies any portion of it. Small globular yellowish bodies may be seen projecting from beneath the surface: these are Nabothian follicles, and are due to obstructed and dilated cervical glands.

(2) The nature of the discharge, whether glutinous or liquid, clear or opalescent, blood-stained or not.

(3) The colour of the cervix, whether violet, red, or pale pink.

(4) The whole of the anterior wall of the vagina. The amount of rugosity and violet discoloration, if present.

(5) The condition of the orifice of the urethra; whether pus can be expressed from it; whether the lips are red and everted, or if the orifice is occupied by a urethral caruncle.

It would be here advisable, in case the sound could not have been passed with previous trials, to attempt to pass it with the speculum *in situ*, the anterior lip being steadied by the application of a tenaculum.

(6) The anterior fornix can be seen descending and ascending with inspiration and expiration.

(7) Should the patient have complained during examination, of a painful spot on the posterior vaginal surface, the speculum may be rotated without difficulty, the anterior wall retracted and the posterior brought into view.

The Advantages of Sims's Speculum.—(1) The cervix is seen as it exists, especially if lacerated.

(2) For operations on the cervix and vagina it is an absolute necessity.

(3) Introduction of the blade and retraction of the perineum is almost a painless proceeding.

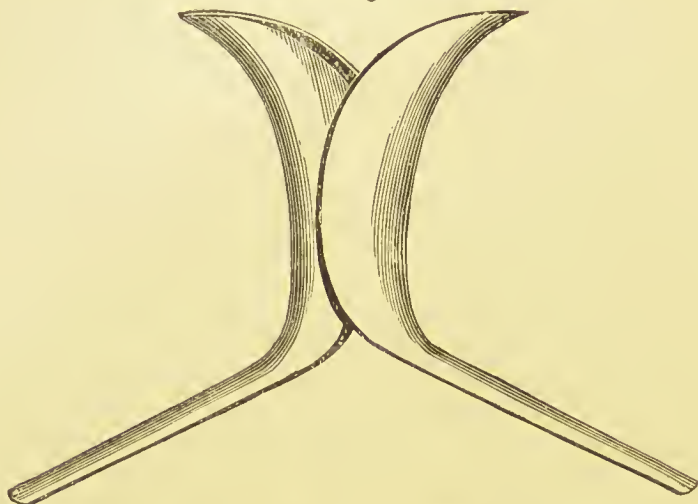
Supposed Disadvantage.—That a skilled assistant is required; but it has been found that with an ordinary nurse to raise the right buttock and steady the tenaculum, the operator holding the speculum, no other assistance is required.

(iii.) *Neugebauer's Speculum.*—This is a divided Sims's, the anterior and smaller blade fitting into the larger posterior one. (Fig. 38.)

How to Use Neugebauer's Speculum.—The larger blade, being warmed and oiled, is introduced exactly as a Sims's speculum, and held by the left hand. The patient now raises her right thigh and the smaller blade is passed into the vagina along its anterior wall, fitting into the larger blade, the operator's forearm resting between the two thighs. This is a self-retaining speculum, and by approximating the handles, stretching of the anterior and

posterior fornix is produced, and the cervical canal is everted. It is a very convenient form of speculum where no assistance can be

FIG. 38.



Neugebauer's speculum.

obtained, and allows of intra-uterine applications without any of the reagent flowing on to the vaginal wall. It should be noted that the eversion of the cervical canal produced by this speculum prevents a very deep laceration of the cervix from being seen.

FIG. 39.



Three Fergusson's specula forming a "nest."

(iv.) *Fergusson's Speculum* is of tubular form, the two already described being spatular. It is usually made in three sizes, which fit into each other, forming a so-called "nest." They are made of silvered glass and covered with vulcanite. The distal end is bevelled and the proximal trumpet-shaped (Fig. 39).

Method of Passing the Fergusson Speculum.—Being warmed and oiled, and the labia separated by the left index-finger and thumb, the bevelled distal end is inserted into the vulval orifice. Great care should be taken to direct it backwards and upwards, so as to avoid the tender surface about the urethra. The whole speculum is now pushed in until the trumpet-shaped end prevents further ingress. In suitable cases the cervix will be found filling the lumen of the distal end, but in some cases this latter may have passed into the posterior cul-de-sac.

Under such conditions it should partially be withdrawn and again passed upwards, but a little forward.

The results obtained by the use of this speculum are very limited. It brings the flaps of a lacerated cervix together, and hence is apt to deceive the operator as to the true condition of the cervix. It gives no view of the vaginal walls. Its advantages appear to be: (i.) less exposure in introduction, which after all is more fancied than real; (ii.) in case of acute gonorrhoeal vaginitis existing it enables the sound to be passed without risk of infection of the endometrium; (iii.) diseased conditions of the endometrium can be treated by intra-uterine applications perhaps more easily.

(v.) *The Tenaculum*, invented by Sims for steadying the cervix, is simply a sharp hook of steel on a stem. The curved point, which is gradually thinned out, is three-eighths of an inch long, and is attached at slightly less than a right angle to the stem. This latter is fixed into a handle of vulcanite (Fig. 40).

(vi.) *The Gum-Elastic Catheter* is familiar to every student and is preferable to the silver and vulcanite instruments in use. No. 8 size should be selected. The urine having been drawn off, it must be measured and set aside for further examination.

With the above description ends the list of the armamentarium necessary for diagnosis in ordinary cases of pelvic disease.

III. Examination per Rectum.

This should be performed by means of the *left* index-finger; the nail being thoroughly smeared with soap and lubricated with some antiseptic ointment, the anus should be exposed and the finger inserted into it, the subsequent direction given being *forwards* and upwards.

In the normal condition, the sphincter ani is felt to resist the entrance of the examining finger, but this is speedily overcome; well above its upper border a hardish smooth swelling is made out projecting into the anterior wall, pushing the mucous membrane before it and apparently blocking up the lumen of the rectum: this is the cervix uteri in its usual situation: it gives to the touch a sensation of being larger than when felt per vaginam. Above this, nothing beyond the folds of rectal mucous membrane should be detected.

Abnormal Conditions to be made out per Rectum:

1. Laceration through sphincter;
2. Fissura ani, usually on the posterior wall;

FIG. 40.



3. Syphilitic or malignant stricture ;
 4. Tubercular, malignant, or syphilitic ulcer.
- All the above are situated fairly low down.
5. On passing the finger higher up, on either side of the median line, tender and slightly enlarged ovaries can be easily palpated.
 6. The usual cervical protrusion may be absent, but above its site another swelling may be encountered: this may be the fundus of a retroverted or flexed uterus, a prolapsed ovary, a prolapsed and dilated Fallopian tube, or cellutitic deposit.

By a combined palpation or *abdomino-rectal* examination, the posterior and often the upper surfaces of these tumours can be made out, thus giving valuable aid towards an accurate diagnosis.

7. If a swelling is met with high up and projecting from the *posterior* rectal wall, it is probably a growth from the sacrum, such as enchondroma.

The rectal speculum, described in all works on Surgery, may be inserted to inspect the condition of the mucous membrane.

Insertion of the whole hand into the rectum as a method of exploration is not a proceeding to be recommended.

In the virgin, the pelvic organs should always be explored by the rectum, in preference to making a vaginal examination.

IV. Examination by the Bladder.

A uterine sound is sufficient for this purpose. In the normal and empty bladder, it should pass $4\frac{1}{2}$ to 5 inches, *including* the urethra, which varies in length. Note whether there is pain in introduction of the instrument into the urethra, more especially at its orifice or when the bulbous end is travelling along the lining membrane.

No abnormal sensation should be produced by pressure of the bulb against the healthy bladder wall, but in cystitis this is followed by acute pain, sometimes amounting to agony, and a desire to micturate.

The condition of the vesical mucous membrane, whether rough or smooth, should be observed; stone may be examined for in the usual way.

Vesico-rectal examination.—In the diagnosis of inversion of the uterus the sound should be held in the bladder, its concavity backwards, and the left index-finger placed in the rectum; if the two can be brought into close apposition, rectal and vesical mucous membrane and peritoneum only intervening, this indicates the absence of the body of the uterus.

How to Pass the Catheter.—This should be performed, if possible, without exposure of the patient: it is only after severe labours where the vulva is much bruised and the relation of the parts altered, that passage of the catheter by the aid of inspection is requisite.

The patient should be in the left lateral decubitus, with the hips well over the edge of the couch: the left fore-finger should be passed into the vagina and the ridge produced by the urethra will be felt running along its anterior wall: withdraw the finger until the meatus urinarius is touched; then, with the catheter in the right hand and held like a pen, insertion into the bladder is easy. The finger in the vagina prevents the instrument passing into that channel: flow of urine will prove the fact that the bladder has been reached.

If the patient is in the dorsal decubitus, the right fore-finger should be passed into the vagina, with its palmar surface upwards, and the catheter introduced by the left hand, carried either over the symphysis pubis, or between the thighs: a long rubber tube may be attached to the instrument with advantage; no urine will then escape into the bed.

Before use, a catheter should be washed thoroughly in 1 in 1000 sublimate, or 1 in 40 carbolic acid solution, and then smeared with eucalyptus and vaseline ointment: cystitis is frequently caused by a dirty catheter.

Normal Secretions from the Genital Organs.—The individual nature of these is somewhat difficult to define, owing to the intricacy of the genital passages: it is usual, however, to describe five parts of the canal as each giving rise to a peculiar discharge. All uterine secretions are alkaline, those from the vagina, acid.

1. From the *uterus* (upper portion) and Fallopian tubes comes a whitish, clear and watery mucus, which has its origin in the utricular glands.
2. From the *cervix* arises a transparent viscid, gelatinous and albuminoid discharge, which consists microscopically of mucous corpuscles and oil globules in a thick plasma; it is always present during the pregnant and unimpregnated condition, and is washed away with each menstruation.
3. From the upper part of the *vagina* and *cervix* is secreted a mucous fluid, consisting chiefly of plasma and not viscid; it contains many scaly epithelial cells. This is the mucus that colours and covers all foreign bodies (pessaries, &c.), which are inserted into the vagina.
4. From the *glands of Bartholin* is ejected a clear secretion during coition and labour.
5. From the *vulval sebaceous glands* comes an oily odorous matter.

Any of the above secretions in excess become *discharges*, and should they be white in colour they are termed “leucorrhœa.”

CHAPTER III.

MENSTRUATION.

By Menstruation we usually mean a periodic hæmorrhagic discharge from the interior of the uterus, occurring every twenty-eight days; more precisely, we may speak of it as a cyclical change accompanied by certain constitutional and local disturbances, the most marked of the latter being the periodic loss of blood from the uterus, mixed with epithelium from the superficial layers of the endometrium.

Date of Appearance.—In this country it usually appears from the fourteenth to the sixteenth year; but statistics prove that its date of onset is influenced by climate, surroundings, and heredity. For instance, in India, among the native races, menstruation often begins as early as nine years of age, whereas in colder climates than our own it may appear as late as the seventeenth or eighteenth year. Again, a girl in the upper classes, accustomed to every comfort and never exposed to hardship, her mind excited by novel-reading and high education, will commence to menstruate earlier than the country-bred girl, plainly fed and working in the open air. Often it is found that if the mother began to menstruate early the daughter will do likewise, and *vice versa*. There seems to be no doubt that the mixing of girls and boys which necessarily occurs among the poorer classes, and which is productive of premature sexual excitement, is a cause of early menstruation.

Rhythm and Duration.—The most common form of menstruation is what is called the twenty-eight-day type—that is to say, when that interval occurs from the commencement of one flow to the appearance of another. Twenty-seven and twenty-one day varieties also are not uncommon. A clear understanding of this is necessary, as patients will often say their periods come every week and last fourteen days. By this must be understood that the onset of the period occurs every twenty-one days, lasts fourteen, and that the patient only has a clear interval of seven days; these figures are given for the sake of example only.

Much difference exists in the *duration* of the flow, and although from four to six days may be considered as the average, yet a loss lasting in one person only twenty-four hours, and in another seven or eight days, is quite consistent with perfect health.

In the same way the *amount* of the flow may vary from four to six ounces, although a few drachms or several ounces may be lost without any detriment to the patient.

Character of the Discharge.—The colour varies in each individual. As a rule, it is light brown for the first twenty-four hours ("invasion" stage), becoming either deep red or varying shades of that colour as the discharge increases in quantity, during the second twenty-four hours. Towards the end of the period ("declining" stage) it again loses its dark colour and becomes a dirty pink, and on its cessation is replaced by creamy leucorrhœa. If the flow is excessive its colour may assume the scarlet of ordinary arterial blood. On microscopical examination it is found to consist of red and white blood-corpuscles, compound granular corpuscles, with epithelium from the vagina, cervix and endometrium. No shreds or clots should be present in a natural menstrual discharge. Menstrual fluid does not coagulate under normal conditions. It is acid in reaction, and its want of coagulability is due to admixture with the acid secretions from the vaginal glands. ~~coagulability is due to admixture with the acid secretions from~~ If the blood is collected through a cylindrical speculum as it flows from the external os uteri, coagulation takes place. By some it is supposed that the mixing of the blood with acid vaginal mucus is sufficient to cause non-coagulation, and that the clotting which occurs in very excessive losses is due to the amount of acidity in the vagina being insufficient to neutralise the alkalinity of the blood.

General Phenomena of Menstruation.—In perfect health, menstruation goes on without pain or even discomfort; but such a state of things is not general, and a large proportion of women suffer from pelvic uneasiness and a certain feeling of malaise, not amounting, however, to disease.

Jacobi has computed that of the cases collected by her, 35 per cent. *never* suffered at any time from either pain, discomfort or weakness, during the flow; and in 54 per cent. (including the former) the presence of menstruation was not found to interfere in any way with their avocation.

The first appearance of menstruation accompanies certain constitutional bodily and mental changes. Hair appears on the mons veneris, which itself becomes more developed. The breasts enlarge, the thyroid gland increases in size, and the pelvis assumes its ultimate form. These changes alter a woman's general shape and give the female her distinguishing contour.

Certain mental changes also occur; whereas previously she mixed freely with the opposite sex of her own age, she now becomes shy and avoids them; hysterical manifestations may also arise. At first, menstruation may appear once and cease for some months, then become regular; in others a regular rhythm is assumed from the very onset. Premonitory symptoms of menstruation are not uncommon—back-ache, groin-ache, pains down the inner side of the legs, and general pelvic uneasiness often usher in the menstrual flow. These are accompanied by changes in temper and mental condition, usually of an irritable nature. The breasts often become swollen, the areola slightly darkened in colour; infra-orbital lines appear, and deepening of already existing pigmentation takes place. Irritation of the bladder is not uncommon. The mucous membrane of the cervix and vagina becomes darker and more congested as the onset of the flow approaches, and the cervix itself is softer to the touch. The labia are congested and slightly enlarged.

Before the appearances of the flow, there is slight elevation of temperature (four-fifths to one degree), and the excretion of urea is augmented: a temperature of 100° and slightly over, may occur for the first twenty-four hours of the flow in highly nervous women. Increased vascular tension is present at the onset or a few days before it, and at that time attains its maximum: the minimum tension is found to be from one to four days after the cessation of the flow, from which time it gradually increases up to its maximum again. In the week following menstruation, there is very frequently a "general feeling of well-being" and a greater capacity for exertion, both mental and physical. The uterus probably contracts painlessly and rhythmically all through a patient's sexual life, but more especially during menstruation: this fact, with the general increase in vascularity of the pelvis, must always be borne in mind when considering any menstrual disorder.

Ovulation.—It has been generally accepted as true that at each menstrual epoch a Graafian follicle comes to the surface of the ovary, enlarges and distends its coverings, and finally ruptures, setting free the ovum. By some means unknown to us this finds its way into the Fallopian tube of its corresponding, or possibly opposite, side; whether by application of the fimbriated end to the site of the ruptured follicle, or by the passage of the ovum along the ovarian fimbria into the tube, is at present uncertain; hæmorrhage takes place into the ruptured Graafian follicle, which gradually contracts, its cavity filling up, forming what is termed the *corpus luteum*, chiefly by cellular multiplication of the granular layer. At the end of the second month, the cicatrix is scarcely

visible, while in four months it has quite disappeared; should pregnancy occur, other changes are said to take place, which will be found described in works upon obstetric medicine. The above series of phenomena then are supposed by the majority of observers of the present day to occur at each menstrual period, and further that the rupture of a Graafian follicle is the exciting cause of the uterine hæmorrhage and other signs of menstruation.

There are, however, certain facts which must be mentioned here, as they are opposed to the above expressed views.

1. Ritchie, as early as 1843, contended that the Graafian follicles of the human female do not require the establishment or presence of menstruation for either their development or rupture. He proved that normal follicles became matured as early as the sixth year of a child's life and expelled their contained ova, and yet menstruation did not occur. Jacobi and others admit the *formation* of the follicles during childhood, but think that having attained their full size, they do not rupture, but undergo a physiological involution.

2. According to the statistics of Mr. Lawson Tait, 30 per cent. of his cases, in which both ovaries had been removed, menstruation was not only not interfered with, but increased in quantity. This is met by the objection that it is often impossible to be sure of removing *all* ovarian tissue, the slightest portion remaining would be sufficient to keep up menstruation.

3. It is stated that in many cases of patients dying during menstruation, no ripe or recently ruptured Graafian follicle has been found post-mortem.

Sir John Williams thinks that rupture takes place *before* the appearance of the flow with which it is connected.

4. Lastly, we have the undoubted clinical fact that a woman may conceive during suckling or in advanced phthisis without menstruation being present. Tait concludes that ovulation or the extrusion of a Graafian follicle is less frequent than menstruation, and certainly not concurrent with it or causing it: he explains the rupture of a follicle and the appearance of the discharge being occasionally simultaneous, by supposing that they each have a certain cycle, revolving at different rates; at intervals therefore, they must coincide.

Changes in the Uterus during Menstruation.—It is generally agreed that the endometrium is the source of the hæmorrhagic discharge, that the cervical mucous membrane is passive, and that the Fallopian tubes, so far as their lining membrane is concerned, take no part in its production.

We must remember that it is considered that the endometrium is peculiar in having no true submucous layer; but an interesting

fact has been established by Sir John Williams, which is that in the foetal uterus there is a well-marked submucosa, which lies immediately beneath the peritoneum; taking this as proved, it would make the whole of the uterine muscle and muscularis mucosæ layer (which would be internal to it), a mucous membrane. This is less startling if we remember the structure of the uterus in animals, where the muscular wall is very much thinner and its relation to the submucous layer somewhat similar to that of foetal life.

However this may be, the so-called mucous membrane—*i.e.*, the *endometrium*—is found thickest at the fundus uteri and on the anterior and posterior surfaces of the upper third of the uterus; it is least marked at its junction with the cervical mucous membrane, the lateral borders, and the two cornua.

Immediately previous to menstruation, it is thickest, measuring from one-eighth to one-fourth of an inch in diameter, and this is the condition arrived at before each period: after the flow has ceased, it is reduced to about one-twelfth of an inch. Before the first menstruation occurs—*i.e.*, before puberty—the mucous membrane is only one-twenty-fifth of an inch in thickness.

Thus far there seems to be a general consensus of opinion, but when we come to consider the other changes which take place during menstruation, there is considerable divergence.

(1) **Williams**, considering that the uterus contracts rhythmically, thinks that thereby the blood is driven from the muscular tissue into the mucous membrane, the vessels of which, having undergone fatty change, rupture, and the blood is poured into the uterine cavity and expelled, together with a large portion of the endometrium; while new mucous membrane is derived from a proliferation of the elements of the muscular walls of the uterus. In other words, we have as the chief factors of this theory:

A fatty degeneration of the vascular walls, with consequent hæmorrhage; an ENTIRE denudation of the muscular tissue; and a re-formation of the endometrium from groups of round cells in the muscular tissue.

(2) **Kundrat and Engelmann** coincide in the fatty degeneration occurring, but believe that only the *superficial* layers of the thickened endometrium come away in the menstrual discharge.

Leopold denies that fatty degeneration occurs, but agrees with the above authors as to the amount of endometrium lost. He believes that the increase in thickness is entirely due to *œdema*.

Some observers, by the evidently erroneous method of examining the matters scraped from the uterus with a curette, have arrived at the conclusion that none of the endometrium comes away, and that the loss is simply a transudation.

(3) In 1886 an entirely original theory was broached by Johnstone, in which he speaks of the endometrium as a "*menstrual organ*."

He criticises at the same time the observations of Williams, saying that the specimens were taken from women dying of acute disease, such as typhoid and tetanus, and that they were not prepared in the best way for observation. He looks upon the endometrium as an instance of adenoid or gland tissue, and not a mucous membrane, and that the hæmorrhagic loss is the same for it as the blood-stream to the spleen or the lymph current to the lymphatic glands. Both Johnstone and Bland Sutton agree in the fact that the menstrual discharge is accompanied by "the shedding of the epithelium of the body and the fundus, as well as that lining the utricular glands near their orifices."

The Object of such a regular loss of blood is unknown, and the reason for its rhythmical appearance every lunar month is equally obscure as that for which labour occurs on a certain date. The so-called "cyclical" theory of menstruation explains it by believing it to be due to a general condition of the vascular system, localised in the generative organs; this is influenced by certain rhythmical changes in their nerve-centres. Lawson Tait believes that the Fallopian tubes are the starting-points of the process: he says the characteristic of tubal occlusion is "*pre-menstrual*" pain, and that in 95 per cent. of his cases in which they were removed there was amenorrhœa. Whatever the cause may be, the discharge certainly relieves vascular tension of the body, especially that occurring in the pelvis. The *onset* of the flow may possibly be caused by the uterus suddenly contracting, and so expelling the blood from the distended capillary vessels.

The Menopause.—By this term we mean the cessation of the regular monthly illness, and the indication that the woman has passed her child-bearing epoch. Menstruation may cease gradually or suddenly, and certain constitutional and general changes are found to take place.

General Symptoms of the Menopause.—Since a woman's reproductive life may be considered as extending over about thirty years, if menstruation has commenced at the age of 14 it should cease at or about 44. The largest number, however, are said to occur at 46, although many cases go on until 50. The patient suffers from vascular changes, such as sudden heats and flushes, without any reason and entirely beyond her control; sweating may or may not follow. Headache, various neuralgias, general or local pruritus, excessive flatulence, and mental alienations are not at all uncommon, and the patient may for a longer or shorter time be hysterical and a partial invalid. These symptoms may last for a varying

period, the patient passing through her menopause in a few months, or it may extend over three or more years. On the other hand, a woman who during her menstrual life has been a constant sufferer from every real and imaginary ache, immediately the catamenial function ceases, may seem to begin a new life, lose all her pain, and become a different individual in every respect.

Local Signs.—The ovaries cease to produce Graafian follicles, shrink, and become wrinkled on their surface. The Fallopian tubes atrophy, and may under certain conditions have their cavities wholly or partially occluded. The changes in the uterus are, however, the most marked feature. The body diminishes in size and the walls in thickness (*vide* Fig. 8, p. 9). On examination per vaginam the cervix, instead of projecting from the vaginal roof, will scarcely be felt, and the os uteri appears as a depression on the surface. Obliteration of both external and internal os uteri is occasionally met with. The canal, however, remains patent and often contains mucus.

The vagina loses its rugose condition, becomes shorter and less dilatable; the fat in the external labia disappears and allows a gaping of the vulval orifice.

Management of Women during Menstruation.—There is nothing in the nature of menstruation to imply the necessity or even desirability of rest for those women whose nutrition is normal. By resting, the blood otherwise employed in muscular activity would tend to travel to the pelvis and increase the already existing congestion. On the other hand, wherever women show much mental irritability at or before menstruation, it is desirable they should rest at the time when the nervous excitement is likely to be most marked.

The wearing of sanitary diapers, avoidance of chill and sexual intercourse during the flow, are of the greatest importance.

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CHAPTER IV.

DEVIATIONS FROM NORMAL MENSTRUATION.

UNDER this heading may be included :

- (1) **Amenorrhœa**—or absence of menstruation.
- (2) **Vicarious Menstruation.**
- (3) **Dysmenorrhœa**—painful or difficult menstruation.
- (4) **Menorrhagia**—or excessive loss during menstruation
(Chap. VI.).

(1) **Amenorrhœa.**

By this term we mean a non-appearance or cessation of the monthly illness during a woman's sexual life—*i.e.*, between puberty and the menopause.

Although it should be treated as a symptom rather than as disease in itself, it will be found more convenient to consider it here. Amenorrhœa is usually divided into two classes : (*a*) *primitive*, where the flow has never appeared ; (*b*) *secondary or accidental*, where although the flow has appeared it has become suppressed. The author, however, has preferred to classify the various forms of amenorrhœa by their mode of causation. For the proper performance of menstruation we must have the uterus, ovaries, tubes, and vagina normal in anatomy and function ; the blood must be in a healthy state, and the tone of the nervous system, especially that of the vaso-motor, within proper limits. The causes of amenorrhœa may therefore be divided into four classes :

i. **Congenital.**—The uterus may be absent or rudimentary ; the ovaries, however, being normal. The converse of this may be the case—*viz.*, a normal uterus with rudimentary ovaries ; entire absence of the ovaries is extremely rare. The infantile type may persist in both uterus and ovaries throughout life. Atresia of the cervix (p. 130), the vagina (p. 106), or the vulva (imperforate hymen) (p. 104) will be considered under their separate heads.

ii. **Acquired**—(*a*) *Local* : atresia of the genital canal, more particularly of the vagina, may occur as the result of adhesions

subsequent to severe operations, or by the introduction of caustics for the purpose of abortion. Removal of the ovaries alone, the tubes alone, or both, in a large proportion of cases produces cessation of menstruation.

Uterine atrophy, cystic disease of the ovaries, or extensive inflammation of the uterine appendages often produce amenorrhœa, but the two latter conditions may be complicated by menorrhagia. It is found that patients suffering from vesico-vaginal fistula rarely menstruate; if, however, the fistula be repaired and heal, the amenorrhœa ceases.

Exposure to cold is one of the most fertile causes: it is accompanied by much pain and often abdominal distension. Slight local pelvic peritonitis may doubtless occur, although not in all cases.

(b) *General or Constitutional*.—Nervous shock, as is instanced by the receipt of bad or good news, and the amenorrhœa of the newly married, but without the existence of pregnancy.

After an attack of acute puerperal septicæmia, amenorrhœa may exist for many months. Mental disorders, Bright's disease, scarlatina, typhoid, and myxœdema have a somewhat similar effect upon the menstrual flow.

Phthisis in young girls may easily be mistaken for anæmia, and the apices of the lungs should always be examined for disease.

Anæmia, and its converse, plethora.

iii. *Physiological*.—(a) *Pregnancy*. Should a woman, previously regular, *suddenly* cease to menstruate, her general health remaining good, this condition may be suspected. It is possible for a woman to menstruate two or three times during the early months, and in certain rare cases through the whole length of pregnancy. (b) *Lactation* is normally attended by amenorrhœa, but in certain exceptional cases women menstruate regularly throughout.

iv. *Anomalous*.—Under this class may be included cases where, by change of climate or locality, amenorrhœa is produced. Examples of this may be found among young country servants who are quite regular when at home, but who on taking service in London almost immediately become amenorrhœic. Again, during long voyages from cold to hot climates or *vice versâ*; lastly, those cases in which the sexual apparatus seems exhausted, as in women after a severe labour, but whose health is otherwise perfectly good.

Treatment.—(1) In cases of amenorrhœa caused by anæmia. This class is by far the largest, and usually occurs in young unmarried women. Hence any local treatment is to be unhesitatingly condemned certain conditions excepted.

General.—It will often be found that the occupation of the

patient is a sedentary one, and that accommodation is limited. These should be remedied if possible. A cold bath in the morning, followed by a brisk towelling; four simple meals in the day; a sharp walk of half an hour twice daily; the wearing of warm and loose clothing, are essential.

Medicinal.—Many anæmic women, by following the above course, and being treated by purgatives, very rapidly lose their anæmia, and much stress has been laid by some authorities upon “fæcal intoxication” as a cause of anæmia. This is a re-absorption of the septic products of digestion from fæces accumulating in the colon. On the other hand, it is found that purgatives alone may fail, and that iron, or iron and a purgative, are necessary to effect a cure. The old-fashioned ferruginous cathartic was invented for this purpose, and a good instance of it is as follows:

R Ferri Sulphatis	gr. i-ij
Magnesiæ Sulphatis	gr. xx
Acidi Sulphurici Aromatici	℥ xv
Tincturæ Zingiberis	ʒij
Inf. Gentianæ Co.	ad ʒj

Two tablespoonfuls to be taken twice a day, about ten and six, after meals.

The disadvantage of this mixture is its nauseous taste, otherwise it is the most satisfactory that we have at our command.

It may be found, however, that this form of taking iron is productive of sickness, frontal headache, and dryness of the lips and skin. These are sure indications for its cessation, and an alkaline cathartic mixture of iron should be prescribed as follows:

R Ferri Sulphatis	gr. i-ij
Sodæ Bicarbonatis	gr. xv
Sodæ Sulphatis	ʒj
Tincturæ Cardamomi Co.	℥ xx
Infusi Quassiæ	ʒj

Two tablespoonfuls twice or thrice daily after meals.

Under certain conditions neither of these plans succeed, and a preliminary course of slight saline purgation is necessary before the exhibition of the iron. If the tongue be clean and the bowels well open, the iron should be taken in the form of a pill, combined with an aperient, as:

R Ferri Sulphatis	gr. ijss
Potassæ Carbonatis	gr. ijss
Extracti Aloes liquidi	gr. $\frac{1}{4}$ – $\frac{1}{2}$

One pill three times a day after food, with a wineglassful of cold water, for a week.

At the end of a week the quantity of pills should be increased to five a day, two being taken night and morning. This must be continued for a fortnight, and finally as many as nine pills a day may be taken. It is better to give a saline purge, such as Carlsbad or Friedrichshall water, every morning.

Treatment may extend over from six to eight weeks. Iron can also be given in the form of reduced iron (gr. ij) and the saccharated carbonate of iron (gr. xxx).

A drug which is often successful when iron and purgatives fail is the permanganate of potash, and a pill as under should be given three times a day. Its value in all probability depends upon its oxygen-yielding powers.

R Potassii Permanganatis	.	.	.	.	gr. ij
Kaolin	.	.	.	.	gr. ij
Vaselin	.	.	.	.	q.s.

(2) Cases where a chill has delayed or suppressed a period. As the patient is usually in much pain, sometimes amounting to agony, absolute rest in bed is essential. Before this, however, sitting in a hip-bath, filled with mustard and hot water, for a quarter of an hour, or the feet in the same solution, should be resorted to. It must be remembered that suppressed menstruation is often accompanied by localised peritonitis and salpingitis, that recurrence is frequent, and that if every precaution is not taken the disease may become chronic.

For medical treatment nothing acts better than a glass of hot gin-and-water, followed by a Dover's powder (gr. x). Copious diaphoresis results. Instead of gin-and-water, a mixture as follows :

R Liq. Ammon. Acet.	.	.	.	.	5j
Sp. Æther. Sulph. Co.	.	.	.	.	5ss
Mist. Chloroformi	.	.	.	.	3j

may be ordered every four hours.

If the abdomen is distended and very tender, the knees drawn up, and the face anxious, a morphia and belladonna suppository should be given, and a light poultice applied to the abdomen. Routine treatment is generally advisable when the period is over, and until the next appears, and for this nothing is better than the ordinary "mistura alba" of the Hospital Pharmacopœias :

R Magnesiae Carbonatis	.	.	.	.	gr. x
Magnesiae Sulphatis	.	.	.	.	gr. xx to 5ss
Aq. Menthae Piperitæ	.	.	.	.	ad 3j

Twice or thrice daily as required.

Some authorities suggest emmenagogues. The list includes many drugs, but the only ones that will be found of much avail are, *Ol. Sabinae* in $\mathbb{M}$ iv doses, and the aloes and myrrh pill (B.P.); the value of ergot is doubtful.

As the next period approaches the mustard-and-water hip-baths should be resumed, and three or four leeches applied round the anus, in unmarried women; while, if married, they may be placed on the cervix through the speculum (Fergusson's), and bleeding encouraged by warm douches after they drop off: the objection to their use is that they may escape into the vagina and cause pain, and cases have been recorded of a leech passing into the uterine cavity; the cervix should therefore be plugged with cotton-wool. Care must be taken that the hæmorrhage is not too free.

An enema of

<i>Ol. Rutæ</i>	.	.	.	.	.	.	.	$\mathbb{M}$ xx
<i>Ol. Terebinth.</i>	.	.	.	.	.	.	.	$\mathfrak{J}$ j

in a little gruel is often of service as a stimulating injection.

Scarification or puncture of the cervix is not necessary and may lead to danger: stimulation of the breasts is useless and irritating.

(3) Conditions in which the amenorrhœa seems to be due to a sluggishness or want of activity of the ovarian system. In these cases no medical treatment appears to have any effect—indeed iron is productive of harm, and the only remedy of any avail is electricity. All that is required is a small Gaiffe's battery producing an interrupted current. One electrode is placed over the junction of the last lumbar and first sacral vertebræ, the other alternately over the right and left ovarian regions. The skin being moistened with salt and water, the current should be passed for from five to fifteen minutes twice a day. In married women one pole may be introduced into the uterine cavity. The most favourable time for its application is at the date when the menstrual epoch should occur.

Cases of amenorrhœa in which a local examination is advisable:

(a) Where general signs of menstruation occur every month, but no flow follows, and where a slowly enlarging tumour may be felt in the median line above the symphysis pubis (*vide* p. 105).

(b) Where the patient, in perfect health and hitherto menstruating regularly, suddenly becomes amenorrhœic. Pregnancy should always be suspected in such a case, and the breast signs carefully inquired into; but even under these circumstances examination *per rectum* is better undertaken to ascertain if the uterus is enlarged. Never examine a servant without her consent, and except in the presence of a third party.

(c) In a married woman, where amenorrhœa has existed for some time, and in whom no other signs of pregnancy have arisen.

Any treatment directed to increasing in size a congenitally small uterus by scraping the interior, dilating the cervix, or wearing an intra-uterine pessary, is not advisable; for it must be remembered that even if slight hæmorrhage is produced, that *in itself* does not constitute menstruation.

(2) Vicarious Menstruation.

Much doubt is present in the minds of observers as to the existence of such a disease: it is described as a flow of blood from a site other than the normal one, and at the time menstruation should occur. It may supplement or replace the usual monthly flow.

The object of the loss of blood seems to be to relieve vascular tension, and it usually occurs at what would otherwise have been a menstrual epoch. Hæmorrhages may take place from any of the mucous membranes, but generally from that lining the nose; pulmonary, gastric, and rectal hæmorrhages are described; petechiæ may appear on the skin and conjunctivæ, chronic ulcers may bleed. The amount lost may be profuse, so as to threaten life, or just sufficient to relieve the vascular tension present.

Many of these cases are really instances of purpura hæmorrhagica, scurvy, or hæmophilia, and they should be received with considerable caution.

CHAPTER V.

DEVIATIONS FROM NORMAL MENSTRUATION.

(*Continued.*)

(3) Dysmenorrhœa.

DYSMENORRHŒA may be described as pain occurring in connection with the menstrual discharge, but limited to a so-called "genital area" or "sphere"; by this term is meant the area contained between a line passing transversely round the abdomen at about the level of the iliac crests (including the umbilicus) above, and the knees below; the surface supplied by the crural branch of the genito-crural nerve on the inner side of the thigh is often the site of the pain.

Any pain experienced either just before or during menstruation other than within this area, cannot fall under the head of dysmenorrhœa.

Many women suffer from various pains and neurotic disturbances immediately before or during menstruation, such as headache (usually frontal), epigastric pain, vomiting attributed to dyspepsia, submammary pain, and neuralgias of all kinds: we may meet with various grades of neurosis, from a general uneasiness or restlessness up to mania. All these depend on the effect of increased vascular tension and blood-pressure upon the nerve-centres.

Our law reports prove that attacks of kleptomania and dipsomania are far from uncommon in women about the menstrual epoch; many are not responsible for their actions at such times.

Pain is a difficult symptom to estimate accurately in women; where it interferes with pleasure or avocation it will be the more noticed and therefore felt; moreover, an amount of pain which by one is described as merely "discomfort" will amount to "agony" in another. Temperament, social position, surroundings, and heredity must therefore always be given due consideration.

In treating such a complex subject as dysmenorrhœa, the simplest method appears to be a division into three varieties, viz.:

- (a) Congestive or Pre-menstrual ;
- (b) Membranous ;
- (c) Spasmodic.

The so-called "gouty" and "rheumatic" forms of dysmenorrhœa are really inflammatory in nature and may be included in the first variety.

With our present knowledge of the ripening and rupture of the Graafian follicles it seems inadvisable to add an "ovarian" dysmenorrhœa to the list. There is every reason to suppose that the ovary may be attacked by neuralgia as are other organs ; this is, however, quite independent of menstruation.

(a) Congestive or Pre-menstrual Dysmenorrhœa.

The latter of these two is perhaps a novel term, but it seems suitable in that it expresses the time at which pain usually occurs in this class of case—viz., *chiefly* before the onset of the flow : it includes the congestive and inflammatory varieties of most authors.

The pathological causes which may lead to this variety of dysmenorrhœa are :

- (1) Pelvic inflammations (para- and perimetritis) ;
- (2) Metritis ;
- (3) Presence of a fibroid in the uterine wall or projecting into its cavity ;
- (4) Retroflexion and retroversion, under certain conditions ;
- (5) Certain cardiac and hepatic affections.

The influence of pelvic inflammation will be most clearly shown by the history of a case. A patient, menstruating up to the present time normally and painlessly, owing to a chill is attacked by slight local pelvic peritonitis (perimetritis). The acute symptoms subside under treatment, but adhesions have formed which tend in various degrees to displace the hitherto normally situated uterus, ovaries and tubes. The uterus may be bound down in a state of retroversion or retroflexion, the circulation in the broad ligaments interfered with, the tube twisted in various ways, and the fimbriated end become adherent to the surface of the ovary. This latter organ also may lose its mobility and become more or less firmly fixed in the pelvis. Should a repetition of the pelvic peritonitis occur, which is not unlikely, the above pathological condition is aggravated.

Given that during menstruation enlargement from increased vascularity of the pelvic organs occurs, it can easily be understood how the presence of these adhesions will alter the circulation of

the displaced organs. A local venous stasis will be produced as the result of obstruction to the return of venous blood from the pelvis.

Gonorrhœal infection through the tubes may cause local peritonitis and adhesions; a chill or sepsis after abortion or labour may be productive of a like effect.

Characters of the Pain.—It usually begins at varying intervals after the cessation of the last period, and gradually increases with the vascular tension up to the onset of the flow, when the pain is as a rule relieved with the disappearing congestion; anything which tends to stop the flow will increase the suffering. The parts involved naturally give rise to localised pain; for instance, if the left tube and ovary be affected, then pain is found to occur as a rule on that side; and it may radiate along the inner surface of the same thigh. Darting pains are also experienced through the body to the sacrum.

It will be thus seen that this is essentially a secondary disorder—*i.e.*, it very rarely commences with the first onset of menstruation.

The presence of a fibroid in the walls of the uterus, or as a projection into its cavity, acts as a foreign body, which the uterus attempts to expel by painful contractions, whether menstruation be present or no. An interstitial fibroid may interfere in the same way with the normal painless uterine contractions by making them irregular and painful. If a fibroid in the anterior wall and reaching well up into the hypogastrium be carefully observed, it will be found that it increases in size as the result of the hyperæmia due to the approaching menstrual epoch. The pain and discomfort experienced by the patient will be augmented in a proportionate degree. Relief to the pain and diminution in size will simultaneously occur with the establishment of the flow.

Treatment.—If the pathological condition present be due to peritonic adhesions, manifestly medication must be administered for the relief of the pelvic venous stasis which we have shown to exist. It must be remembered that the left ovary, the peritoneum over the lower part of the sigmoid flexure, and the upper third of the rectum are the parts most frequently involved, and that continued but not excessive purgation will be the most likely method of relieving the congestion there. A course of saline aperients or of the liquid extract of cascara sagrada will produce this effect. Decoction of aloes in ʒj doses has also been recommended. The presence of fæces will naturally influence the pain, especially if the disease be on the left side; opium is therefore contra-indicated in all its forms, as tending to produce constipation.

Abdominal Massage.—This is recommended in the hope that

absorption of the adhesions may be aided, and the circulation through the diseased parts improved. It should on no account be undertaken if the presence of pus in the tubes or in adventitious loculi be suspected, as rupture is likely to occur, with possibly consequent fatal peritonitis. *Vaginal Douches*.—These consist in the administration of two pints of hot water (temp. 115° to 120° Fahr.) twice daily, night and morning, per vaginam, the woman lying on her back over a bed-pan. Their effect is to produce a constriction of the vessels at the bases of the broad ligaments and so to relieve congestion. By the addition of iodine to the water a certain absorptive effect is produced. The beneficial action of glycerin pledgets, when applied to the roof of the vagina, is open to doubt.

Lastly, *abdominal section*. Two courses may be followed in this operation. (a) On passing the hand into the pelvis, the parts may be found bound down and displaced by adhesions, but otherwise healthy. The plan usually adopted should be to break down these adhesions with the fingers, free the displaced organs, and thus remove the cause of the venous congestion.

(β) If pus be discovered in the tubes or elsewhere, it may be necessary to remove the appendages, or drain the abscess cavity. This mode of treatment should on no account be resorted to until a prolonged course of palliative treatment—at least three months—has been carried out, and finally a thorough examination of the pelvic organs made, the patient being under the influence of an anæsthetic.

Refer for further treatment to the chapter on “Para- and Perimetritis” (p. 187).

(b) Membranous Dysmenorrhœa.

This consists of the discharge during menstruation of the superficial part of the uterine mucous membrane, in a more or less coherent state, with or without pain.

Facts elicited by Clinical Evidence.—A woman may pass membranes for a considerable time during menstruation *without* pain; then suddenly or gradually begin to pass them *with* pain, which only ceases with the menopause. In the former case this cannot be called true membranous *dysmenorrhœa*. The passage of membranes, with pain, is a primary disorder as a rule, beginning with the onset of menstruation. They may be passed with or without pain by virgins. A patient so affected is as a rule sterile, though not necessarily so; should pregnancy occur, there is a return to the original condition after labour.

Description of a Typical Case.—The patient is usually seized with pain more or less coincidently with the onset of the flow. It is usually located in the hypogastrium, is colicky in nature, and may gradually spread over the whole “genital area.” Although the flow is copious from the first, the pain is not relieved by it. Towards the end of twenty-four hours the loss diminishes in quantity, suffering at the same time becoming greater; it may become agonising and even produce convulsions; with the passage of a piece of membrane (which may be a complete cast of the interior of the uterus or only a partial one) almost entire relief of the pain results. Free discharge now returns. If the whole of the membrane is not discharged at once, a recurrence of the preceding phenomena will take place, but the pain will always be found to be greatest when the flow is least, and *vice versa*.

Description of the Dysmenorrhœal Membrane.—If passed *en masse* and examined under water it will be found to consist of a triangular collapsed or only slightly distended sac with three openings, corresponding to the three openings in the uterine cavity. It has an external shaggy villous appearance, while internally it is smooth and covered with a number of minute holes which are in reality the openings of uterine glands.

Its length is about one and a half to two inches, its breadth one inch, its thickness $\frac{1}{24}$ to $\frac{1}{12}$ inch. The sac may contain blood-clot or serous fluid, but is as a rule empty.

Cause of the Pain.—By those who believe in the “obstructive theory” of painful menstruation, it is attributed to the membrane becoming fixed over the internal os uteri, and so preventing the blood-flow; the uterus contracts painfully to overcome this obstacle. The generally accepted theory is, however, that the pain is produced by the passage of the membrane over an extremely sensitive internal os uteri.

Diagnosis.—The chief conditions liable to be mistaken for membranous dysmenorrhœa are:

(1) Products of conception, whether of an early abortion, the decidua from a double uterus, or the shreddy material passed in extra-uterine pregnancy. Should the patient be a married woman, separation from her husband is naturally the best way of clearing up the diagnosis.

(2) Fibrinous uterine casts,

(3) Altered blood-clot, and

(4) Casts of the vagina and bladder.

Treatment.—When membranes are passed without dysmenorrhœa no treatment should be adopted. Where pain accompanies their passage, treatment should be directed to the sensitive condition of the cervix, and to the endometrium. The passage

of a series of graduated bougies (p. 85), and the application of glycerol of carbolic acid, sometimes gives great relief. With regard to the endometrial condition, repeated scraping with a sharp eurette immediately before menstruation has been found of value. A case so treated by the author at three consecutive periods was productive of good results *during* the treatment only, relapse taking place after its cessation. Division of the internal os uteri cannot be recommended. As a last resource, removal of the ovaries and tubes has been practised, but statistics are so far insufficient to test the efficacy of this proceeding.

(c) Spasmodic Dysmenorrhœa.

This includes the neuralgic form. The pain is essentially spasmodic in nature, varying in intensity, and is always localised in the uterus. It is generally primary, beginning with the first appearance of the catamenia, but in some cases it may occur in multiparous women, and has been likened to the colic which follows labour in the form of after-pains in a worn-out uterus.

Characteristics of the Pain.—It always precedes the onset of the flow by from a few to twenty-four hours, and continues until the flow is fully established; it may then cease entirely, or certainly decline in intensity. The severity varies, but may be so great as to produce convulsive seizures. The bladder and rectum often become temporarily affected (strangury, tenesmus). In this variety with a copious flow the pain is less, and *vice versa*. It is increased as the patient gets older, becomes worse as the result of marriage, and only ceases with the menopause: parturition frequently cures it.

Membranous dysmenorrhœa and disease of the tubes and ovaries may often complicate spasmodic dysmenorrhœa. Under such conditions the character of the pain follows no typical course.

Pathology.—Much discussion has taken place as to the causation of this disorder, and it will be well to give in outline the two chief theories.

First, the "mechanical" or "obstructive" theory. According to this, any condition tending to narrow or distort the uterine canal causes an obstruction to the outlet of the menstrual flow. The uterus contracts painfully to overcome this. Instances are to be found in a uterine displacement or flexion, congenital stenosis, congestion and swelling of the uterine lining membrane, and the presence of a fibroid projecting into the uterine cavity: the advocates of this theory believe that the large majority of cases of dysmenorrhœa are really instances of "menstrual retention."

The second or "congestive" theory is that it is due to a mixed

vaso-motor and neurotic change; that during menstruation the hyperæmia, which is acknowledged to be present, finds a resistance in the diseased tissue. In health, these tissues give way to the distending blood-vessels, but in disease this does not occur, there is compression of the nerve-endings, and hence pain. This is the view which was originated by Fritsch, and has now received, with some modification, general acceptance.

Objections to the mechanical theory:

(1) It is proved by clinical experience that the majority of flexions are *not* accompanied by dysmenorrhœa (*vide* Chapter xii. p. 149).

(2) During the most intense dysmenorrhœa a No. 8 bougie can be passed through the internal os uteri with ease, but this proceeding is productive of agonising pain during its passage; and is due to the extreme sensitiveness of the surface at the internal os uteri.

(3) A patient may have a succession of extremely painful periods which are suddenly, and without reason, followed by one or more absolutely painless ones.

(4) The pain as a rule begins before the flow, and increases up to an acme with its full establishment, when it gradually ceases.

(5) Women with a pin-hole os uteri as a rule have no pain, and should it occur it is generally due to some collateral disease.

(6) It can be proved by a simple calculation that the amount of blood lost during the menstrual period is at the rate of from 30-40 drops an hour, or half to two-thirds of a drop per minute. This amount could scarcely have any difficulty in passing through a cervix of the narrowest calibre.

(7) Treatment by anti-spasmodics, with the result of increasing the loss, diminishes the suffering.

(8) Extreme pain is present in some cases at the epochs when the menstrual flow should appear, but where there is no sign of hæmorrhagic discharge.

The true test of the existence of a stricture is by passing the sound through the internal os uteri and attempting to withdraw it. Should any difficulty be experienced in this latter act a stricture may be said to exist, not otherwise.

The uterine hypertrophy which undoubtedly occurs after the existence for any length of time of this disorder is due to the "extra work entailed by the uterine colic," and not to hypertrophy from obstruction.

It will frequently be found that cases of spasmodic dysmenorrhœa occur in anæmic girls. This is very probably due to the presence of imperfect anatomical structure like an undeveloped

uterus, or to some defect in the vascular or nervous supplies to the pelvic organs.

Like after-pains, spasmodic dysmenorrhœa is doubtless due to a disturbance in the relations of "uterine polarity": in defining this term, we must consider that the fundus and the cervix of the uterus are two poles, and that they act in opposition—*i.e.*, when there is activity or contraction of the fundus present there will be inhibition or relaxation of the cervix and *vice versâ*. When these two forces are in equilibrium, there is no pain; if, however, either predominates, uterine colic is produced; illustrations of this condition are to be found in the uterine contractions caused by the presence of an intra-uterine polypus in process of expulsion, retained placenta, &c.

Treatment.—Pregnancy and labour usually cure this condition, but should the patient remain sterile, the pain becomes worse.

Constitutional Treatment.—This should be devoted to increasing the circulation through the pelvic organs, and so promoting their growth and development. Early hours, a cold bath in the morning, walking and riding, should therefore be indulged in during the intervals between the flow. While improving the flow of blood to the pelvis, its exit should also be encouraged. This is fulfilled by the regular administration of saline purgatives. Any extreme corpulence or plethora should be treated on general principles.

During the menstrual period the patient is better in bed; a hot bath and gin-and-water may be administered. Should these fail, anti-spasmodics must be prescribed with volatile stimulants. A very useful combination is as under:

R	Ammonii Bromidi	.	.	.	.	gr. xv.
	Liquor. Ammoniæ Acetat.	.	.	.	.	ʒss
	Spiritus Ætheris Sulph.	.	.	.	.	ʒss
	Tincturæ Belladonnæ	.	.	.	.	℥vj-x
	Misturæ Camphoræ Co.	.	.	.	.	ʒj

Two tablespoonfuls to be taken every two hours while the pain lasts.

A mixture of tincture of castoreum (℥ xx) with 10 minims of tincture of nux vomica occasionally produces good results; but the author has found it often gives rise to immediate sickness. Ergot has been recommended with the idea of converting painful and irregular uterine contractions into painless and regular ones. The above methods of treatment must always be adopted in the single woman, before resort to operative interference. The *local* and generally most successful mode of procedure, however, is by dilatation of the cervical canal. The more favourable cases are those in which agonising pain is produced by the passage of the

bougie through the internal os uteri. Dilatation may be performed in two different ways: (1) by the introduction of graduated bougies over a series of sittings, one or two at a time; (2) by complete dilatation under an anæsthetic at a single sitting. The latter will be described fully in Chapter vii. p. 85.

Gradual dilatation should be performed about a week before the expected onset of a period; three bougies of increasing size being passed at each sitting. The patient must always remain in bed for twenty-four hours after each operation. Full antiseptic precautions should be adopted, the steel bougie kept in hot antiseptic until the moment before introduction, when it must be dipped into carbolic oil and passed with or without the aid of a Sims's speculum and volsella. Cocaine applied to the cervical canal has been found useful as a local anæsthetic in some cases. The passage of a bougie in some patients is attended by such agony, prostration, and sickness, that an anæsthetic is advisable, and the completion of the dilatation at one sitting recommended.

It is generally considered that the presence of recent or old-standing pelvic adhesions is a contra-indication to dilatation. The author, however, ventures to differ with this opinion, and has found from experience that no bad results ensue, but, on the other hand, the patient receives the greatest benefit.

Division of the internal os uteri by a hysterotome is extremely dangerous, and in the majority of cases useless. Dilatation by means of expanding many-bladed instruments is unsatisfactory, and is based on unscientific grounds.

Removal of the ovaries, in order to stay menstruation in a simple and uncomplicated case of spasmodic dysmenorrhœa, is not a proceeding to be recommended.

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CHAPTER VI.

HÆMORRHAGES FROM THE GENITAL ORGANS.

UNDER this heading must be considered all varieties of excessive or abnormal loss of blood from the uterus, vagina, and vulva.

The uterus is the only organ in the human system from which hæmorrhage occurs as a physiological process; and it may be influenced, naturally, by many causes.

Should the loss at the menstrual period be morbidly excessive or beyond that to which the patient is accustomed, the term *menorrhagia* is given to the disorder: should she have hæmorrhage, of a varying quantity and duration, during the intermenstrual period, the word *metrorrhagia* is applied. It may be seen at once that clinically these two diseases cannot well be separately treated of, and we must then consider a woman may have (*a*) excess of the normal flow, (*b*) a too frequent recurrence of the flow, or (*c*) an abnormal loss during the intervals of the flow.

Characters of the Blood lost.—It may vary in colour from bright scarlet to dirty brown, and be thick or watery in consistence. The discharge may be very clotted, devoid of clots, or mixed with shreds. The odour may be faint or fœtid; the latter being due to retention in the vagina for a considerable time, or to admixture with decomposing material as in malignant disease. Hæmorrhages from the genital organs are chiefly *uterine*—*i.e.*, the blood issues from the external os uteri: it must be remembered that this does not always indicate existence of uterine disease. We may also have *vaginal* and *puddental* or *vulval* hæmorrhages, where the vagina or vulva are primarily or secondarily affected.

Hæmorrhage must be looked upon as a symptom only, and not as a disease which can always be treated on the same lines; if the amount lost is very large or continuous, serious effects may soon become visible in the patient's condition—extreme debility, hydræmia, hysterical and nervous manifestations, and lastly death.

Hæmorrhage may occur either independently of pregnancy or

as an accident or sequela of that state—the former class falling chiefly under the notice of the gynæcologist.

(A) Hæmorrhages Independent of Pregnancy.

The most satisfactory method of considering *uterine* hæmorrhages is by dividing them into classes according to their causation.

Class I.—Cases in which no deviation from the normal structure can be found in the uterus or uterine appendages, and where some constitutional ailment is the exciting cause; or where nothing, either general or local, can be made out.

Class II.—Cases in which the uterus itself may be healthy, but sufficient disease of the tubes, ovaries, or broad ligaments, &c., exists to produce the hæmorrhage.

Class III.—Cases in which the disease is evidently uterine.

Class I.

Under this definition we may include :

1. General or *constitutional* disease, such as
Hæmophilia;
Purpura hæmorrhagica;
Malaria, with splenic enlargement.
2. Certain forms of *cardiac disease*, more especially mitral regurgitation; a tendency to amenorrhœa is, however, the rule.
3. Causes obstructing the flow of the blood into the inferior vena cava, such as constipation, and pressure of a large tumour, not necessarily pelvic.
4. Causes interfering with the portal circulation, as congestion of the liver.
5. Bright's disease, accompanied by high arterial tension.
6. Excess of physiological function, as hyper-lactation.
7. The hæmorrhage of early menstruation.
8. The hæmorrhage occurring at the menopause, and as the result of change of climate.

In all the above the pelvic organs would necessarily be thoroughly examined, to exclude any local cause. Treatment, as a rule, should be on general principles.

In some of these disorders a profuse loss is the patient's gain, as in cardiac disease or hepatic congestion, and no treatment should be directed to stay it.

When over-suckling is the evident cause, tonics and treatment conducive to general improvement in nutrition are desirable; if these fail, the necessary step is to wean the child.

By the hæmorrhage of early menstruation is not meant the true precocious menstruation, but the profuse loss which sometimes occurs in young girls for the first few periods, this gradually diminishing, the loss at last becoming normal.

The floodings often attendant on the menopause are of more importance: these may occur periodically, being usually of menorrhagic type; they often give great relief, in plethoric women especially, to the headache and flushings which so often accompany the climacteric or period of sexual involution. At the same time, these great losses are sometimes the first indications of commencing malignant disease, and as a consequence too careful an exploration of the pelvic organs cannot be made.

Calomel in small doses, with a mild saline aperient, is often effectual; bromide of potash and tartrate of soda suit in some cases. Iron is very rarely tolerated.

In all cases of hæmorrhage without apparent cause, be sure to examine the urine for presence of albumen.

With regard to those cases of hæmorrhage in which no cause can be ascertained, and which usually occur in women approaching the menopause, digitalis given in the form of infusion and in doses of $\mathfrak{z}\text{ij}$ every four hours, is often very effectual; if a good result is likely to accrue from its use, benefit occurs in about twenty-four hours. Its mode of action is not known with certainty, whether through a general action on the circulation, or by some specific effect upon the uterine muscular fibre.

Should the hæmorrhage be copious, beyond physiological amount, and evidently exhausting the patient, the usual hæmostatics may be tried, and finally local treatment.

Any preparation of ergot will be useful, and it may be given alone or in combination with some drug having a sedative effect on the circulation, as bromide of potash.

A convenient mixture is—

R	Extract. Ergotæ Liquid.		$\mathfrak{z}\text{ss}$
	Potassii Bromidi		gr. xij
	Aquam		ad $\mathfrak{z}\text{ss}$

A tablespoonful every four hours.

Or a pill containing ergotin, hydrastis and cannabis indica :

R	Ergotin		gr. ss
	Hydrastinæ Hydrochlor. . . .		gr. $\frac{1}{4}$
	Cannabin Tannat.		gr. ss

Fiat pil. One pill every two hours.

Gallic acid alone in gr. xx doses, or tincture of hamamelis, in ℥v-x to the ounce, thrice daily, is of great value.

The patient should have absolute rest by remaining in bed, the foot of which is raised by means of blocks of wood, 12-18 inches high, so that the blood-flow may tend to pass from the pelvis; the patient must lie in the dorsal decubitus, and not sit up even to pass water, this being performed over a bed-slipper; all drinks should be cold, every mental excitement or worry prevented, and no alcohol allowed; it must be remembered that unless *entire* rest can be maintained treatment is of very little use. She should have hot-water douches, two pints in amount, thrice daily, or oftener, given while lying down over a bed-pan; the water to be at least 110° Fahr. or over. Infusion of quassia in the proportion of ʒj to the pint may be added as a styptic.

Finally, where the hæmorrhage amounts to a flooding and is uncontrollable, as in purpura hæmorrhagica or hæmophilia, *vaginal plugging* with an iodoform bandage must be resorted to. This consists of sal alembroth gauze and is very pliable, thus easily adapting itself to the irregularities of the vaginal canal. A Sims's speculum should be inserted and the gauze pushed in by the finger into each cul-de-sac, being sprinkled as it enters with iodoform powder; the packing must be continued as the speculum is gradually withdrawn, and a piece of the bandage left hanging outside the vulva, for the purpose of easy removal; it should never be allowed to remain in the vagina longer than twenty-four hours for fear of sepsis arising.

In the absence of the speculum, the first and second finger of the left hand may be inserted into the vagina, then opened, and the palmar surface turned backwards towards the anus; the right hand can by this means easily pass in the bandage.

Class II.

Under this heading we may include all diseases of the ovaries, tubes and broad ligaments, which are accompanied by uterine hæmorrhage.

1. Chronic ovaritis.
2. Ovarian irritation, from excessive venery.
3. Malignant ovarian tumours: it must be remembered that the simple or multiple cystomata are rarely accompanied by hæmorrhage, but rather by scanty menstruation.
4. The metrostaxis occurring after ovariectomy, at varying dates after the operation.
5. Peri- and parametritis.

6. Extra-peritoneal hæmatocele.

7. Fæcal impaction.

Each of these conditions will be treated of under their appropriate headings.

Class III.

Many affections of the *uterus* are accompanied by hæmorrhage, and this class will be found to be the largest and most important.

1. Subinvolution at a more or less remote period after abortion or labour.
2. Endometritis, whether the simple or "fungous" form.
3. Fibroid tumours of the body or cervix.
4. Malignant disease, either carcinoma or sarcoma of the body or cervix.
5. Fibroid or mucous polypus.
6. Inversion of the uterus.
7. Retroversions and -flexions, with engorgement and hyperplasia.
8. Granular "erosion" of the cervix.
9. Hæmorrhage from ulcers on a completely prolapsed uterus.
10. Hæmorrhage may follow passage of the sound.
11. In rare cases, application of leeches will be followed by profuse hæmorrhage.

Hæmorrhage from the Vagina may be due to

1. Primary or secondary malignant disease; sarcomatous nodules bleed very freely if touched;
2. Ulceration by a pessary or foreign body;
3. Rupture of the mucous membrane from direct violence or coitus;
4. Laceration of the hymen.

Hæmorrhage from the Vulva or Pudendum may result from

1. Malignant disease of the labia;
2. Urethral caruncle;
3. Sarcoma commencing at the urethral orifice.

B. Hæmorrhages resulting from Pregnancy.

Many of these belong to the domain of the obstetrician, and mere mention of them here will be sufficient.

1. Some women may menstruate normally during the early months of pregnancy.
2. A normal pregnancy may be complicated by an erosion or malignant disease of the cervix; fibroid or polypus.

3. Placenta prævia, when the hæmorrhage may occur at any period after the fifth month.
4. Post-partum and recurrent hæmorrhage.
5. Secondary hæmorrhage.

Those cases which fall to the share of the gynæcologist may be divided into three subdivisions, and hæmorrhage may be produced as a consequence of

- (a) Retained products of conception or an apoplectiform ovum.
- (b) Hydatiform degeneration of the chorion, or vesicular mole.
- (c) Extra-uterine gestation.

(a) Under the first heading we may include the hæmorrhage due to **incomplete abortion** or to placental remains after removal of an adherent placenta and placental polypus.

An apoplectiform ovum is produced by extravasations of blood into various portions of its structure, usually into the cavity between the decidua vera and reflexa. Hæmorrhage may also occur, but more rarely, between the decidua vera and the wall of the uterus.

When hæmorrhage is slight and proper care is taken, the pregnancy may go on to term; if, however, the hæmorrhage is great and regular pains ensue, a true abortion takes place. If the products of conception are retained for some weeks and then expelled, we find that a fleshy mass has formed which has old or recent clots on its surface, and on cutting into the decidua they are found to be much thickened owing to blood-extravasation. The amniotic cavity is lined by irregular nodular walls, which being laid open present masses of coagulated blood in the process of organisation. Liquor amnii is present, but the fœtus has either become absorbed or is represented by an amorphous swelling at the free end of a short and stunted umbilical cord.

A Placental Polypus is produced by the deposit of layers of fibrinous material upon a small piece of retained and adherent placenta, the tumour projecting into the uterine cavity. Sudden and often severe hæmorrhage may result at varying periods after delivery.

(b) **Hydatiform Degeneration of the Chorion, or Vesicular Mole**, is due to disease of the chorion: when fully developed the uterus will be found distended by bladder-like bodies containing serous fluid, and in size varying from a pin's-head to a filbert; they have the appearance of a bunch of grapes: their mode of origin is, however, peculiar; they do not arise by separate pedicles, but often one vesicle is seen attached by a pedicle to another, the pedicle itself being in some cases dilated with serous material.

It is then evident that this is a disease dependent upon the existence of pregnancy. The chief indications of its presence are greater rapidity of increase in size of the uterus, as compared with a normal pregnancy: the patient also has a hæmorrhagic and profuse watery discharge, like currant juice, in which these vesicular bodies can be frequently found.

When diagnosed, treatment consists in giving ergot to promote expulsion. If the hæmorrhage is copious and the os dilated, the fingers must be inserted and the mass extracted. Should the os uteri be undilated, artificial means must be adopted (p. 84). The mass may be attached by a thick pedicle, which often is deeply rooted in the uterine wall: thinning will have taken place, and incautious attempts at removal may result in rupture of the uterus.

(c) **Extra-uterine Gestation** (*vide* Chap. xvi.).

Differential Diagnosis.—The whole basis of treatment consists without doubt in an accurate diagnosis. By careful inquiry and digital examination we may eliminate classes I. and II. We must then ascertain the possibility of an early pregnancy existing; then whether that pregnancy will continue if left alone, or whether abortion is imminent or has partially taken place—in other words, whether everything has “come away.” If pregnancy is present, the state of the breasts should be noted, and any violet discoloration of the vaginal mucous membrane observed: the state of the cervix and the size of the uterus must be made out. Let us suppose that an early pregnancy is diagnosed, that there is a history of a fright or a fall followed by much pain and flooding; that clots and pieces of formed material are being passed; that the hæmorrhage instead of ceasing in a few days’ time continues and increases on exertion; that the flow is accompanied by the passage of clots, and the discharge develops a fætid smell; lastly, the onset of a rigor and rise in temperature indicate conclusively that we have here an instance of incomplete abortion; a portion of the decidua has remained behind, undergone putrefactive changes, and given rise to sapræmia or septic intoxication. It must be noted, however, that the piece left *in utero* may be very small and not become putrid. Under these conditions the patient will suffer from hæmorrhage and the passage of clots only. On examination, the os uteri externum will usually be found patent and soft.

Presuming that pregnancy may be excluded, our inquiry is narrowed down to class III. We must ascertain what the uterine condition is which produces the hæmorrhage. Examination per vaginam may reveal a cauliflower growth from the cervix, or a cervical or uterine polypus in the process of extrusion.

In another instance, bimanually the uterus is found more or less enlarged. This may be due to chronic endometritis, subinvolution, a fibroid in the uterine walls or projecting into its cavity, or, lastly, malignant disease of the uterine body. The sound is now carefully inserted (*vide* p. 44).

It may pass a longer distance than normal. The passage of its point along the mucous membrane will tell us whether it is smooth or roughened; hæmorrhage may follow in greater or less quantities. If the os uteri does not admit more than the tip of the sound, we must resort to some artificial method of dilatation. This will be fully described in the next chapter.

Dilatation of the Cervix enables us:

(1) To apply certain caustic and hæmostatic remedies to the endometrium.

(2) To scrape the interior by means of the sharp or blunt curette.

(3) To pass the index or little finger up to the fundus uteri, and ascertain by actual touch the physical conditions present.

(4) To remove certain uterine growths by means of forceps or the *écraseur*.

CHAPTER VII.

DILATATION OF THE CERVIX UTERI FOR THE PURPOSES OF DIAGNOSIS AND TREATMENT.

DILATATION may be performed—

- (1) As a means of diagnosis;
- (2) As a preliminary to the use of the curette or removal of intra-uterine growths;
- (3) As a remedy to stay hæmorrhage;
- (4) As a method of cure for spasmodic dysmenorrhœa.

The instruments necessary for *rapid* dilatation are solid bougies of steel and vulcanite, a sound, a Sims's speculum, and a volsella; for *slow* dilatation, laminaria-, tupelo- or sponge-tents are required. Dilatation of the cervix is a physiological phenomenon; free secretion takes place during the expansion of the os uteri, as may be seen during the early stages of labour; but this is not the case in the non-pregnant uterus where there is rigidity with lack of moisture. Any attempt to produce too rapid dilatation of the cervix may result not in yielding, but in tearing. Hence our object in dilatation of the non-pregnant uterus is to produce a soft and moist condition of the cervix. Experience shows us that this can only be effected slowly, and by the introduction into the canal of tents. When a sufficient dilatation and softening has been produced—*i.e.*, in about twenty-four hours—the tent may be withdrawn, and the operation continued by means of the solid bougies. Where pregnancy has recently existed, or after partial abortion, immediate treatment by the bougies may be resorted to without previous use of tents.

Many varieties of bougies have been invented, but here the description of two will be sufficient: (1) the solid steel dilators; (2) Hegar's dilators. The solid steel bougies as used by the author have somewhat the shape of the ordinary uterine sound, are twelve in number, and graduated in size from No. 4 to No. 15. Like a sound, the upper portion, which measures $2\frac{1}{2}$ in., is bent at an angle of about 160° with the solid handle, a circular shallow *depression* indicating the $2\frac{1}{2}$ in. mark (Fig. 41).

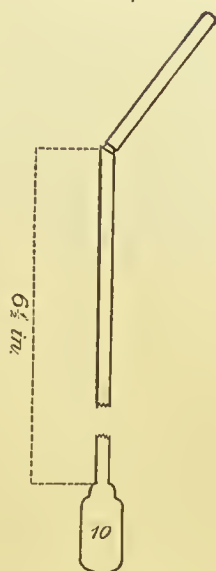
Hegar's dilators are solid vulcanite bougies, graduated after the German method from Nos. 1 to 26. They are $5\frac{1}{4}$ in. in length, of which the handle forms $1\frac{1}{2}$ in., the remainder the bougie. They should be made in one piece, and with a slight curve, the apex tapering off to a blunt point (Fig. 42).

It has been found that Nos. 1 to 7, owing to their slender structure, are apt to break during use; the author therefore recommends that dilatation should be begun with the steel bougies and continued up to No. 15, which corresponds to Hegar No. 7. Further dilatation may be then proceeded with by the Hegar's dilators, commencing at No. 8.

A volsella is necessary to fix the uterus: it consists of a pair of double hooks turned towards each other on handles, which are crossed as in ordinary scissors and provided with a catch (Fig. 43).

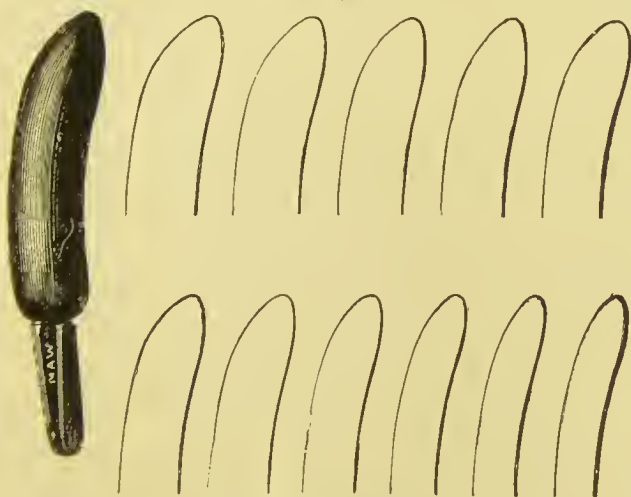
(I.) **Operation by Bougies alone.**—The patient is better anæsthetised, although it is not necessary in every case; she is then put into the left lateral position in preference to the dorsal, and an antiseptic douche (1 in 2000 HgCl_2) is administered (p. 90).

FIG. 41.



Solid steel dilator, No. 10. (Author's pattern.)

FIG. 42.

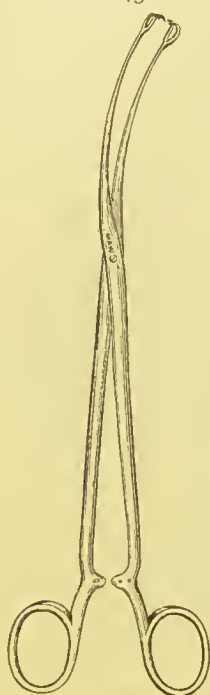


Hegar's dilators.

The largest size is shown in full and shaded, the remainder in outline and the apices only.

The bougies should always lie in a flat tray containing hot antiseptic fluid. A Sims's speculum is now passed and held by an assistant, as in the figure, and a sound inserted to ascertain the direction of the uterine cavity. If antelexion is present, then the anterior lip should be seized with the volsella and fixed by slight traction (Fig. 44). If retroverted or retroflexed, then the posterior lip should be utilised. Traction by the volsella tends to straighten out the uterine canal, and thus makes the passage of the bougies easier. The right buttock being raised and the

FIG. 43.



The volsella.
(With catch.)

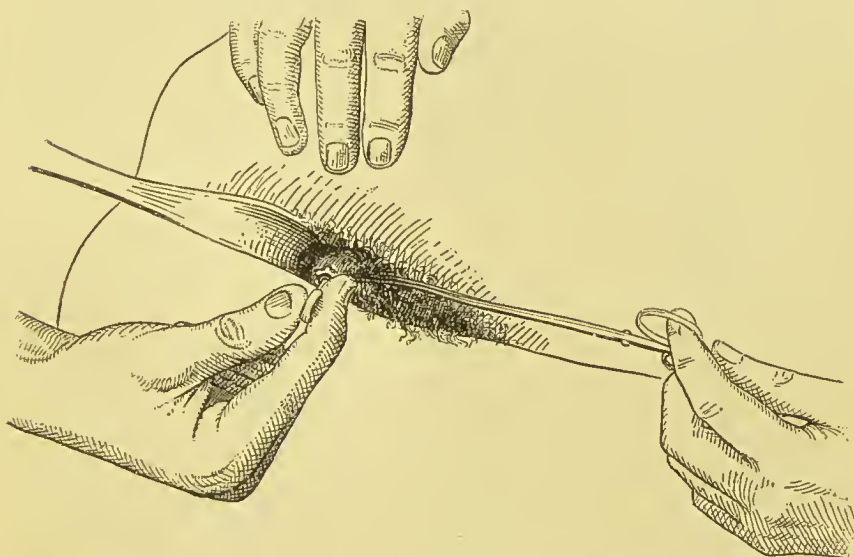
speculum well drawn back by the assistant, the operator with his left hand draws down the uterus with the volsella, bringing the handle forward in front of the symphysis pubis. The bougie is taken out of the antiseptic solution and oiled, and the point passed by means of the right hand into the cervical canal until the internal os uteri is reached; resistance will now be felt. Firm and continuous pressure in a proper direction must be made, and in a short time this resistance gives way, and the bougie passes into the uterine cavity. An interstitial fibroid produces a tortuous channel, and much difficulty will often be experienced in passing a bougie in such a case. It will be found on attempting to withdraw the instrument that it is grasped by the internal os uteri; in the course of from one to five minutes this spasm will relax, and only then should the bougie be withdrawn. The next in size, warmed and oiled, should be ready and introduced in the same manner; and succeeding ones are inserted until the required dilatation is produced. According to the dilatability of the cervix, this may extend over a varying period up to eighty minutes.

For the purposes of local intra-uterine applications, dilatation to No. 10 Hegar will be found sufficient; for the use of the curette, No. 12 is necessary. The index-finger can be introduced into the uterine cavity after the passage of No. 19 or 20 Hegar, while full dilatation to No. 26 is required for any operation with scissors or *écraseur* on intra-uterine growths. A certain amount of shock and vomiting may occur during rapid dilatation, even under anæsthesia. After dilatation it is well to give an antiseptic intra-uterine douche by means of the double catheter, figured and described below (Fig. 45). It is safer to swab the interior of

the uterus with iodised phenol, and to plug the vagina loosely with iodoform gauze.

In certain cases where nothing intra-uterine has been found, and where hæmorrhage has been profuse, the mere dilatation has proved effectual. For the cure of spasmodic dysmenorrhœa, the proper proceeding appears to be to pass a laminaria tent into the cervix, allow it to produce a certain amount of softening and dilatation (which occurs in from twelve to twenty-four hours), then proceed to use Hegar's dilators up to No. 20 or more. This seems to

FIG. 44.



Method of passing a steel bougie.

The patient in left lateral decubitus, the uterus drawn down by the volsella, the perineum retracted by Sims's speculum, and the steel bougie inserted. The position of the assistant's left hand is purposely exaggerated for the sake of clearness. (From a photograph.)

paralyse the musculature around the internal os uteri and relieves the pain. Application of iodised phenol should be resorted to immediately afterwards, to preserve asepsis and destroy the sensitiveness which is usually present at that spot.

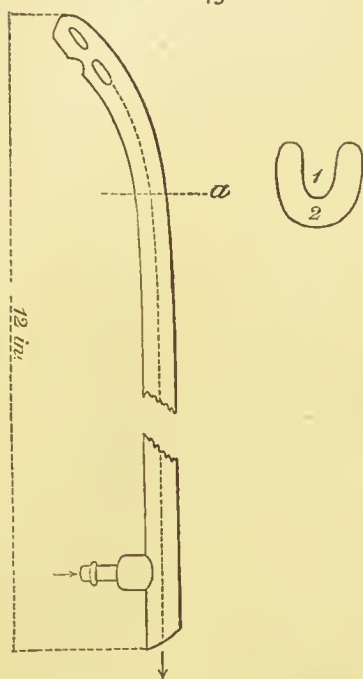
Difficulties and Dangers of the Operation.—The apparent difficulty due to non-dilatability is overcome by means of the tents. The complication produced by a fibroid altering the direction of the uterine canal has been mentioned. Extreme ante flexion or retro flexion gives trouble during the passage of the earlier numbers, but as dilatation is effected this disappears.

The dangers are—

1. Laceration of the cervix;
2. Rupture of the uterus;
3. Sepsis, and its sequelæ;
4. Hæmatoma between the layers of the broad ligament.

Too much stress cannot be laid upon the antiseptic method of procedure, without which it would be wrong to attempt the operation, more especially in cases complicated by a semi-fixed uterus.

FIG. 45.



Double channelled intra-uterine tube (celluloid).

Transverse section through *a*.

1. Channel of exit for soiled fluid.
2. Channel of inlet for anti-septic solution.

quieted down there seems very little reason against their use. Where a malignant condition of the uterine body is known to exist they should only be resorted to with the greatest caution, or not at all.

(II.) **Slow Dilatation by Tents.**—To produce the slow dilatation, and as a preparatory measure to the rapid dilatation, tents are made use of.

Laceration of the cervix begins as a rule at the internal and extends towards the external os uteri; it may be deep or superficial, and is recognised by a sulcus or groove into which the finger can be passed from above downwards; rarely, laceration into the peritoneum may take place.

Rupture of the uterus is liable to occur in cases where the uterine wall has been weakened by the fatty changes and thinning which accompany the completion of the menopause, or by the softened condition from infiltration either by malignant disease, or rarely by vesicular mole (p. 82).

Septicæmia from absorption through a laceration may occur and run the same course as in the puerperal state, or may simply be indicated by an attack of pelvic cellulitis.

Contra-indications to the use of Hegar's bougies are very few: a recent attack of peri- or parametritis would certainly be one; when the effects of a salpingitis have

There are three varieties—1, sponge (Fig. 46); 2, tupelo; 3, laminaria; the last may be either long (6 in.) or short (3 in.) (Fig. 47).

The objection to their use formerly was that they often led to sepsis; but this was doubtless due to improper preparation, and now that every precaution is taken with regard to their antiseptic manufacture, there seems no reason why they should not be more frequently employed.

1. The patient should always be douched with an antiseptic solution.

FIG. 48.

FIG. 46.

Sponge
tent.

FIG. 47.

Laminaria tent
(short).Instruments for introduction
of sponge tents.

FIG. 49.



2. After passing the tent, absolute rest in bed for some days.
3. After removal (in less than twenty-four hours), douche again, and if sufficient dilatation is not produced, Hegar's dilators may be used.

How to Introduce a Tent.—The patient is placed in the left lateral position: after the douche the Sims's speculum is introduced, the anterior or posterior lip held by the tenaculum, and a long laminaria tent pushed in. If a short laminaria- or sponge-tent is used, one of the forms of introducer figured above will be necessary (Figs. 48, 49). The vagina should then be douched again, and lightly packed with iodoform gauze.

At the end of twenty-four hours it must be withdrawn, and it will then be found to be much increased in circumference by imbibition of moisture; if the os uteri internum has been in a condition of spasm, it will be marked by it.

The Curette, and its method of use.

The curette may be used with a sharp ("sharp" curette) or dull edge ("dull wire" curette).

The sharp form was invented by Recamier: as modified at present, it consists of a loop of steel, fixed into a copper or steel stem, the handle being either continuous with this or made of vulcanite (Fig. 50). Its uses are to scrape away portions of fungous endometritis, especially in that form which exists in the folds at the base and sides of fibroids: and in other endometrial conditions for the purpose of microscopical examination, as malignant disease or ordinary endometritis.

The dull wire curette, as invented by Thomas (Fig. 51), has no cutting edge, but consists of a blunt loop on a flexible copper stem. It is valuable as a means of diagnosis, often bringing away a small piece of decidual tissue or a small polypus. It may be used without preliminary dilatation of the cervix.

Sims has modified the loop by adding a transverse, slightly serrated edge to one surface (Fig. 52).

The "*flushing curette*" is a Recamier with a hollow stem, for the purpose of washing away tissue as it is scraped off (Fig. 53), at the same time keeping up a continuous flow of antiseptic fluid over the bared surface.

How to Use the Sharp Curette.—The patient's position is as for dilatation. The curette is curved to suit the uterine canal, and the sharp edge is then passed firmly over the anterior surface. A scraping or rasping sound will accompany this process. The posterior wall and the sides are then done in turn, the angles near the Fallopian tubes being the most difficult to clear. If a uterus be scraped, as it is thought, thoroughly, and be examined post-mortem, strips of mucous membrane will often be found untouched, showing the difficulties of complete erasion.

Contra-indications.—Where much disease of the uterine appendages exists; and with insufficient uterine dilatation. An aperture may be made through a uterine wall which has become softened by senile changes or by malignant infiltration.

On the Mode of Administering an Antiseptic Uterine Douche.
—The solution to be used should first be carefully prepared (1 in 1000 to 4000 corrosive sublimate, or 1 in 40 to 60 carbolic acid solution) and placed in the douche-can; the douche may be given in the left lateral or the dorsal decubitus, and the chief point to be remembered is that there should be free exit for the returning

fluid; otherwise, under the pressure of the ingoing fluid, the uterus might become acutely distended, or the solution pass into the Fallopian tubes, and so into the peritoneum, especially in puerperal cases: acute pain, followed by collapse and later

FIG. 50.



Sims's curette.

FIG. 51.



Thomas's dull-wire curette.

FIG. 52.



Sims's curette with serrated edges (double).

FIG. 53.



Flushing curette.

peritonitis, may indicate the advent of this accident. These dangers are obviated by

- (1) The use of the double-channelled catheter (Fig. 45), which should be passed into the uterus; it may be bent to any shape after a few minutes' immersion in hot water;

- (2) The retraction of the perineum, which enables air to enter the vagina;
- (3) Firm abdominal pressure;
- (4) The use of the can- or syphon-douche, *not* a Higginson.

Be careful to empty the vagina: much fluid can be retained in the upper portion of this organ ("ballooning of vagina"), and although absorption is only feebly performed, still, if the fluid be of a poisonous nature, ill effects might follow (mercurialism); retraction of the perineum either by the finger or the catheter *in situ*, is the most efficient means of allowing free escape of the solution.

CHAPTER VIII.

MALFORMATIONS AND AFFECTIONS OF THE EXTERNAL ORGANS OF GENERATION.

A. **Malformations.**—A reference to the development of these organs will indicate the various ways in which deviations from the normal can take place (p. 29); the following are the most common:

- (1) Complete atresia of the vulva;
- (2) Persistence of the cloaca, in which the vagina and urethra, with the rectum, have one common opening;
- (3) Persistence of the urogenital sinus, into which, owing to non-development of the urethra, the bladder opens directly.

(4) **Hermaphroditism.**—This term indicates the fact that one individual is possessed of the genital organs of both sexes in a more or less perfect form. A *true* hermaphrodite would therefore have one or both ovaries capable of secreting healthy ova, and one or both testes producing spermatozoa capable of fertilising them; the existence of such cases is at least problematical, owing to want of sufficient evidence, and their further consideration is therefore unnecessary.

Spurious or False Hermaphroditism is a condition in which the genital organs simulate those of the opposite sex; hence we may have:

- (a) Those cases in which the external genitals of a female individual resemble those of a male (Fig. 54).

A female may be possessed of a very large clitoris and prepuce; if in addition the labia are united in a thin median raphé the likeness to a scrotum is evident; should the ovaries be prolapsed into the labia, and the clitoris be provided with a urethral canal, both of which conditions are extremely rare, the difficulty of diagnosis becomes manifestly great.

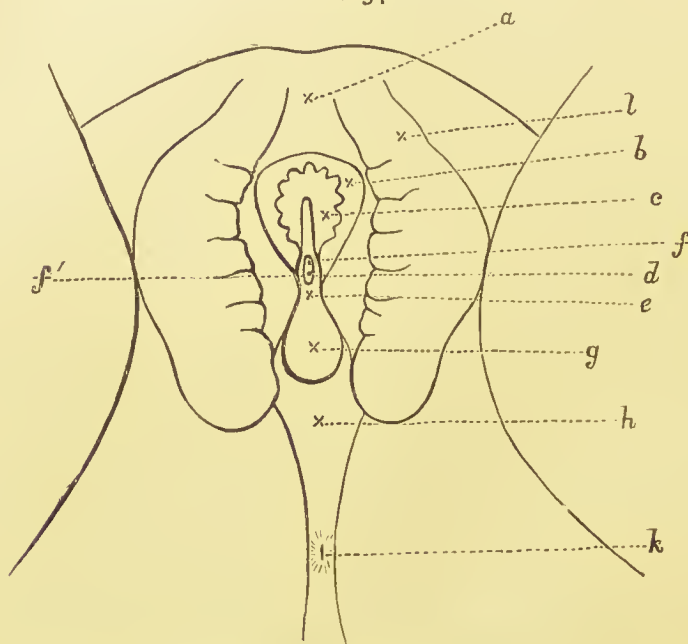
- (β) When the external genitalia of a male resemble those of a female.

The penis and prepuce may be very small, and if hypospadias be present and extensive enough to produce a cleft between the

lobes of the scrotum, the resemblance to the vulva is very marked ; if the testicles have not descended, as is not infrequently the case, the diagnosis is very obscure.

Diagnosis.—(*α*) During infancy. Combined recto-vesical examination (p. 52) should be carried out, and if there is distinct evidence of a solid body in the site of the uterus, that organ may

FIG. 54.



Genital organs of a spurious hermaphrodite (female). (Outline drawing from nature.)

The genitalia are seen from below, the clitoris being slightly raised.

- | | |
|--|---|
| <i>a</i> . Clitoris. | <i>ff'</i> . Boundaries of groove (nymphæ). |
| <i>b</i> . Prepuce. | <i>g</i> . Opening of urogenital sinus. |
| <i>c</i> . Glans clitoridis. | <i>h</i> . Perineum. |
| <i>d</i> . Ducts opening into lacuna magna. | <i>k</i> . Anus. |
| <i>e</i> . Groove leading into urogenital sinus. | <i>l</i> . External labium. |

be surmised as present. Small roundish bodies in the labia or cleft scrotum, may be prolapsed ovaries or normal testes; microscopical examination after removal is necessary to distinguish them.

(*β*) When puberty is reached, swelling of the breasts and menstrual discharge in the female, or seminal discharge, hair on the face, and a guttural voice in the male, must be looked for.

Fortunately most of these cases die in infancy : more than one may be born of the same mother ; in the case seen by the author (Fig. 54), the child was the fourth spurious hermaphrodite out of a family of nine, one surviving fifty-nine days ; another member presented an undescended testicle, lying in the inguinal canal.

An important question arises during infancy as to sex in the christening of the child ; in later life, should the individual survive, it is better to bring it up as a boy until further evidence of sex is adduced. Sterility in these cases is the rule.

B. Affections of the External Organs of Generation.

This includes all diseases of the pudendum and hymen : those of the urethra and urethral orifice will be treated of in Chapter xviii.

For the study of these affections, examination by inspection is necessary, and the dorsal is the most favourable decubitus, as the left hand can be used to open up the parts, while the right forefinger explores. An ordinary surgical probe with blunt and thin ends, and a magnifying glass, are useful adjuncts ; the former to localise tender spots and search for the orifices of the glands of Bartholin, while the latter enables the observer to see more clearly the condition of the surface and the presence of fissures, bristles or inflamed spots. The appearance of any disease may be much altered from the position of the vulva ; from friction while walking, from the passage of discharges over it, and from the wearing of diapers during menstruation. Want of cleanliness is a common cause of many vulval affections ; remedy of this habit therefore cures, or aids in curing, the disease.

I. Eruptions of the Vulva.

The vulva and its neighbourhood may be attacked by almost every variety of skin affection, and for their special characteristics a work on medicine should be consulted.

They consist of acne, aphthæ, erysipelas, erythema, eczema, furuncles or boils, herpes, lichen, prurigo, and parasitic rashes. A diphtheritic exudation is described as accompanying the ordinary throat affection, but it is extremely rare.

Acne is due to engorgement of the sebaceous glands which exist over the surfaces of the labia : the pubic region may also be encroached upon. Patients suffering from it are usually below par in health. Should suppuration occur, a true furuncle or boil results and the pus must find an exit ; a solution of r in 2000

perchloride of mercury acts as a dispersive if used before suppuration takes place.

Erysipelas usually spreads from other parts, or complicates septic cases after labour, or operation, such as perineorrhaphy; it is never limited entirely to the vulva.

Erythema may be due to the friction of clothes, or a diaper, especially in fat women with tender skins, or when there is an acrid vaginal discharge continually pouring over the vulva.

The mercurial erythema after vaginal injections of corrosive sublimate must be noted.

Treatment.—Cleanliness; keep the parts dry by dusting them with vinolia powder; plug the vagina with cotton-wool pledgets; the acrid discharges are thus kept from the vulva and local treatment is then possible.

Eczema is by far the most common eruption on the external genitalia. It assumes the dry or the moist form. The labia majora are chiefly affected, and the disease may spread from thence to the perineum, on to the pubes, into the folds between the buttocks or to the groins.

It is productive of much irritation (*pruritus*) and smarting; the patient rubs or scratches the affected parts, and further inflammation, hæmorrhage, and the formation of scabs result. The effects upon the mental condition of the sufferer are often very serious, producing resort to alcohol or narcotics, or even a tendency to suicidal mania. The discovery of the causation is the key to the *treatment*.

If this be gout and rheumatism, then alkalies followed by iron, or visits first to Aix-la-Chapelle or Aix-les-Bains, then to Spa.

Should the patient be stout and freely perspiring, carefully clean and dry the sweating parts with some bland powder, like cimolia; if diabetes be present, treat that disease constitutionally by diet, &c. When there is an irritating vaginal discharge, as in cancer, or vesicovaginal fistula, frequent antiseptic vaginal douches should be administered, followed by the insertion into the vagina of a pledget of cotton-wool, soaked in a saturated solution of carbonate of soda.

If the perineum is attacked by the chronic gouty form, and recovery takes place after some time, cicatricial contraction occurs, which may give rise to much pain and misery.

An ointment of—

R Plumbi Acetat.	.	.	.	.	.	gr. xv
Liq. Carbonis Detergens	.	.	.	.	.	ʒi xv
Vaseline	}	.	.	.	.	āā ʒss
Ol. Eucalypt.	}	.	.	.	.	

Fiat unguent.,

makes an excellent local application.

Ordinary milk and rose-water, a lead lotion or a ground-rice poultice, will soothe any acute symptoms. The patient should always wash the parts with water and oatmeal and a non-irritating soap like sulphur soap.

Furuncles or Boils are often found in women on the labia majora and nates; they come out in crops, usually when the menstrual period is expected, or during it, and give much discomfort. The author has found no local treatment of avail; but decoct. sarsæ co. ʒss twice daily in water often produces entire cure.

Herpes usually occurs in connection with pregnancy, and is called H. gestationis.

Parasites.—These are common in old people, and consist of the *acarus scabiei* (or scabies) and the *pediculus pubis*, affecting the hair on the *mons veneris*. The prominent symptom is itching of the part; a certain cure is an ointment as under:

R. Ung. Hydrarg. Ammon.	}		āā ʒss
Vaseline			

Fiat unguent.

Two applications usually suffice; the hairs should never be shaved or cut, as maddening pruritus will occur during their regrowth.

II. Inflammations of the Vulva.

Under this heading may be included:

- (i.) Vulvitis, acute and chronic;
 - (α) Erythematous, without suppuration;
 - (β) Purulent;
 - (γ) Follicular.

(ii.) Inflammation of the vulvo-vaginal glands (glands of Bartholin) and abscess of the labia majora.

(i.) (α) In *erythematous* vulvitis there is marked redness of the mucous membrane, but no suppuration; any irritating discharge passing continually over the vulva will cause it, such as from carcinomatous ulceration, decomposed urine, or vesico-vaginal fistula, faeces in recto-vesical fistula, and the urine of diabetes.

(β) *Primary* purulent vulvitis, or inflammation of the vulva, may occur in children or adults, and be due to chill, want of cleanliness, contagion from gonorrhœa, or as a complication of the acute specific fevers, like scarlatina.

The *secondary* form is usually the result of a spreading downwards from the vagina.

Causation.—In children it is often stated to be due to attempted rape; this is extremely rare. A child sleeping with a person

suffering from gonorrhœa or its complications, or using the same articles of toilet, may become infected; ascarides wandering from the anus into the vulva, are certainly a frequent cause.

There is no certain diagnostic sign which enables us to separate the non-specific and the specific forms of vulvitis; in adults it is nearly always gonorrhœal.

Symptoms.—Itching, smarting, and a feeling of swelling of the labia, followed by a more or less purulent discharge, which stains the linen a dirty yellow colour; if the inflammation be very acute, slight blood-staining may result. The labia will be found adhered together by the discharge in the morning, and often this has a fetid odour.

Physical Signs.—The parts are reddened and angry-looking, and pus of varying consistence is found on the surface; the parts may be excoriated, and superficial ulceration of the mucous membrane occur in patches. The inguinal glands are enlarged and tender, sometimes going on to suppuration (bubo); complications such as urethritis and vaginitis, or even cystitis, not infrequently arise.

(γ) In *follicular* vulvitis, the mucous membrane is very little affected beyond deepening in colour, but its surface is dotted over with small reddish points, which are the orifices of inflamed mucous follicles; it is rarely the result of gonorrhœa, and may depend upon the existence of pregnancy.

Treatment.—1. Scrupulous cleanliness is of the first importance.

2. During the acute stage, resort should be made to saline purges; warm fomentations, or sitting in hot water, give much relief.

3. As the chronic stage is assumed, stimulating lotions, like sulphate of zinc, gr. iij ad ʒj, or Condyl's fluid, should be applied, by dipping lint into the solution and placing it between the labia, after carefully wiping away any purulent discharge present.

4. At night, inunction with an antiseptic ointment of eucalyptus and vaseline, to prevent adhesion of the inflamed surfaces, should be prescribed.

In the *follicular* form, the best and simplest treatment is to dry the parts carefully with cotton-wool and apply tinct. iodi with a camel's-hair brush to the diseased surface: repeat this four or five times at twenty-four to forty-eight hours' intervals; should any of the follicles present signs of suppuration, a small incision will give the required relief.

In children, a tonic of the syrup of phosphate of iron, ℞xx, with cod-liver oil, thrice daily, should be given.

(ii.) **Inflammation of the Vulvo-vaginal Glands.**—This is usually secondary to vulvitis; the inflammation extends along

the fine ducts and reaches the glands themselves. This is especially the case with the gonorrhœal form; under certain circumstances the disease remains limited to the ducts; these then become blocked by their swollen mucous membrane, and a cyst is produced in the gland from retention of secretion. This cyst may contain ordinary glairy fluid, or pus if suppuration takes place.

Symptoms.—Probably the symptoms of vulvitis have existed for a few days. Then the patient notices that one of the labia majora is much swollen, and that there is sympathetic enlargement of the inguinal glands on the same side; pain of a throbbing nature, heat and pruritus, difficulty in micturition (dysuria), and in walking (dyskinesia), are frequently observed.

Physical Signs.—There may be considerable labial swelling, with redness and superficial œdema, the orifice of the gland may appear inflamed and discharge pus; on drawing the labium aside the inner surface is found projecting, reddened, and glistening; probably fluctuation may be obtained on palpation.

Treatment should be that observed in cases of abscess situated elsewhere; a free incision being made on the *inner* labial surface, and a strip of lint passed into the cavity, to prevent premature superficial healing; sprinkle the vulva with iodoform powder. The object of this proceeding is to obtain healing from the bottom of the wound.

If not freely opened the abscess recurs, or burrows in the cellular tissue in the perineum and around the rectum, requiring subsequently a thorough search for any suppurating tract.

In chronic cases, where there is a pyogenic lining membrane, apply strong liniment of iodine, and stuff the cavity with antiseptic gauze; if the abscess repeatedly recurs, the diseased gland should be dissected out entire.

In the event of prolonged suppuration taking place, constitutional treatment will be found necessary.

Abscess of the labia majora may occur independently of the vulvo-vaginal glands. The connective tissue which forms the greater portion of the labia becomes acutely inflamed, as the result of either vulvitis, injuries, or the like. It differs from the vulvo-vaginal form in the fact that it is not so circumscribed.

III. Syphilis.

This may occur either as a primary sore, condylomata, or a coppery rash about the vulva.

The primary sore is not often seen, as a woman may feel no discomfort from it, and it heals up without treatment, although

induration of the inguinal glands may remain. The vulva, cervix, vagina, perineum, and anus are situations in which it has been observed.

The soft sore more frequently comes under observation; it is more painful, does not occur as a rule singly, and the inguinal glands may suppurate; there is much difficulty in distinguishing the two varieties, and the only certain diagnosis is the occurrence of secondary symptoms.

Commencing lupus and cancer have been occasionally mistaken for a chancre, but the progress of the two former should not leave much doubt as to the diagnosis.

Condylomata, or Mucous Tubercles, are soft, warty growths, each with a sessile broad base and flattened top; they vary in colour, from dark brown to reddish-grey, according to their vascularity, and occur either singly or in patches, at the vulva or around the anus. They are intensely contagious, and infect the different parts of the vulva with which they come into contact; thus a condyloma of the posterior part of the left labium majus will infect the opposite labium, the perineum, and anus. They usually have a watery, offensive, and irritating discharge.

There seems to be little doubt as to their specific origin; they are certainly capable of producing primary syphilis in the male; care must be taken to distinguish them from simple warts.

Treatment.—Cleanliness and soap and water will sometimes cause them to disappear; care should be taken to prevent contagion by contact with other parts of the body. Lotio nigra applied by means of lint laid between the labia usually effects a cure.

When the condylomata have disappeared, it must be remembered that a local manifestation only of the syphilitic infection has been treated, not the constitutional disease; this should therefore be combated in the usual way.

Warts may be independent of both gonorrhœa and syphilis, and result from dirt. They are pediculated, and in that way must be distinguished from condylomata. Lotio plumbi and cleanliness are usually effectual, but the application of Paquelin's cauterium may be necessary.

IV. Malignant Disease.

This nearly always assumes the form of epithelioma. Other varieties may spread to the vulva from the neighbourhood. The clitoris is the most frequent site of origin. In elderly women it usually commences as a tubercle, which breaks down and ulcerates, spreading with a thickening of its edges and bleeding easily on touching.

The inguinal glands are always affected, and ulceration may spread to them; pain, hæmorrhage, and fetid watery discharge are characteristics of this phase of the disease.

Treatment depends upon an accurate and early diagnosis; removal of a small piece of the growth for microscopical examination is essential; then free removal of the tissue around the ulcer and the glands if infected; Paquelin's cautery is perhaps the safer instrument to use in carrying this out, as hæmorrhage is often serious with the knife; the local application of chloride of zinc paste afterwards brings away a large slough.

Death takes place by gradual exhaustion, septic intoxication or an extension of the sloughing, which may involve the femoral or branches of the pudic arteries.

Lupus must be distinguished from the above. Whether it is a manifestation of syphilis or scrofula is uncertain; it is chiefly marked by its slow progress, ulceration, little pain, and absence of glandular infection. There is a tendency to the production of cicatricial contraction during the process of healing.

V. Varicocele and Hæmatoma.

Varicocele of one or both labia is usually the result of pregnancy; the pressure of fibroid growths or anything obstructing the venous return will cause dilatation of the veins. The left labium is the one usually affected, possibly because the left ovarian vein has no valves. It gives rise to discomfort in walking and dull aching pain in the corresponding groin.

Treatment should be directed to the relief of any pressure in the pelvis from pregnancy by an abdominal belt; a fibroid or other tumour, if impacted, should be pushed up into the abdominal cavity.

Patients with a varicocele are liable to rupture of this venous plexus under certain conditions—viz., straining at stool, parturition, or traumatism; the blood is then forced out into the connective tissue of the labium, and an enormous swelling results—called a *hæmatoma* or thrombus: in many cases clotting takes place and the hæmorrhage ceases. The clot may either become absorbed or suppuration may set in; a free incision should be made in this latter case and the pus let out, otherwise no surgical treatment should be attempted.

If hæmorrhage continues, or if the rupture has been external, the sac must be opened slowly by means of a Paquelin's cautery, any vessel tied, and the cavity plugged with antiseptic gauze; everything must be done on the strictest antiseptic lines; it is necessary to interfere in obstetric cases more frequently than in those not associated with pregnancy.

VI. Displacement of other Organs or Portions of other Organs into the Pudendum.

1. Hernia of the intestine or omentum into one or both labia ;
2. Prolapse of either ovary ;
3. Hydrocele.

The inguinal canal may be patent, and one of the above may follow the course of the round ligament into the external labium, and simulate a cyst or abscess of that part.

VII. Fissures and Adhesions.

The former occur as results of first attempts at sexual intercourse, after labour, and may complicate eczema ; they give rise to intense pain during coition (dyspareunia) and difficulty in sitting, sometimes in walking.

Agglutination of the labia, either congenital or as a result of vulvitis, is not uncommon in children ; a probe passed between the labia will be, as a rule, quite sufficient to break down any adhesions. If, however, these have resulted in the adult from injury during, or sloughing after, a severe labour, the knife may be necessary, and the wearing for some time afterwards at intervals of a glass or vulcanite tube (Fig. 56).

Œdema of the vulva may occur as a part of general œdema, as the result of normal pregnancy, or when complicated by Bright's disease ; relief is obtained in such cases by puncturing with a sharp needle in five or six places and allowing the serum to escape.

Pruritus Vulvæ.

This is a symptom rather than a disease ; it accompanies many affections of the vulva, and is due to an irritability of the nerves supplying the external genitals.

It is caused by, or accompanies—

1. Various forms of leucorrhœal discharge ;
2. The irritating discharges of malignant disease ;
3. Abnormalities of urine—*i.e.*, excessive acidity, diabetes, oxaluria, or when urine is passed unconsciously or from vesico-vaginal fistula ;
4. The eruptive diseases of the vulva, especially eczema ;
5. Early pregnancy or normal menstruation ;
6. Ascarides ;
7. The neurotic condition which is present during the menopause ;
8. Immoderate indulgence in tea, opium, or alcohol.

In some cases no cause whatever can be discovered. The irritation varies from slight tingling to maddening irritation; the patient scratches herself, and makes the parts sore. Sleep is lost, and her nervous condition becomes gravely disturbed.

The warmth of bed seems to precipitate an attack in many cases; in some, eating, drinking, or driving appears to be the exciting agent; in others, the pruritus comes on without any reason and at no regular time.

Treatment.—Always search for a constitutional origin, and examine the urine. If leucorrhœa or other discharge be the apparent cause, regular warm vaginal douching with poppy decoction, ℥j to the pint of water, should be employed; in addition a cotton-wool pledget must be passed into the vagina to prevent the discharge passing over the vulva.

For senile pruritus in which very little local abnormality can be discovered, a lotion of 1 in 2000 perchloride of mercury with a pill as follows, is most effectual :

R	Camphoræ	gr. j
	Zinci Valerianat.	gr. ij
Fiat pil. One pill twice daily.		

Bromide of potash, gr. x, with tincture of belladonna, ℥v, forms a useful mixture. Locally the paroxysm is often relieved by holding a hot sponge to the parts, in others a cold one acts most beneficially.

Other remedies are the ordinary lead and opium lotion : or

R	Acid. Carbolicæ	gr. xx
	Acid. Hydrocyan. dil.	ʒiij
	Morphinæ Acetat.	gr. xv
	Glycerinæ	ʒiiss
	Aquam	ad ʒviij
Fiat lotio. To be applied locally on lint.		

The author has found an ointment of cocaine most useful in pregnancy-pruritus. Never give opium if possible; chloral is permissible under certain conditions.

VIII. *Kraurosis.*

This disease was first described by Breisky in 1885, and consists in a peculiar degeneration of the vulval tissues: the labia minora, clitoris and perineal skin atrophy, and the sudoriparous and sebaceous glands of the labia become diminished in size and number. Ulceration and pruritus are frequent. Gonorrhœal discharge certainly predisposes to kraurosis.

Treatment by scraping and applications of caustic has been recommended, but with uncertain result.

CHAPTER IX.

AFFECTIONS OF THE VAGINA.

(A) THE hymen should be considered as a part of the vagina; its diseases and abnormalities will therefore be considered here.

1. **Laceration of the Hymen** from first coitus is usually attended by slight loss of blood, but may also lead to rupture of an artery with consequent profuse hæmorrhage; the only treatment in such cases is ligature of the vessel after thorough exposure, and then stuffing the vaginal orifice with antiseptic gauze, which must be removed before twenty-four hours have elapsed, or sepsis may supervene; a fatal termination has been known to occur from this cause.

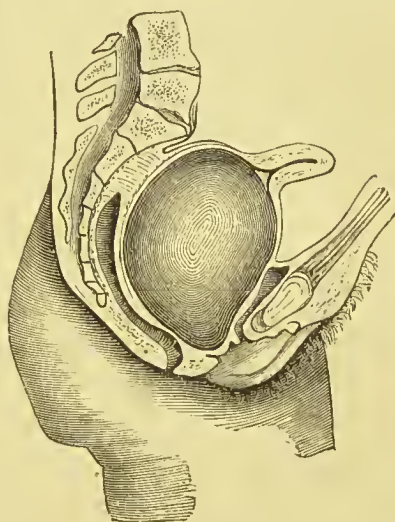
2. **Undue Toughness of the Hymen** may prevent coitus, although not be a bar to the passage of menstrual fluid or to impregnation; palliative treatment may be tried by means of inserting graduated bougies similar to Hegar's dilators, and the occasional passage of the full-sized one when there is any difficulty in coitus; should this fail, the most radical cure is to anæsthetise the patient, and then to exsect the membrane with scissors, being careful to remove the whole of it; this should be followed by the insertion of a glass tube to stay hæmorrhage by pressure; a vulcanite bougie may be worn for a few days subsequently, two or three hours daily. Any bleeding should be arrested in the usual way.

3. **Tender Carunculæ Myrtiliformes.**—These are usually looked upon as the remains of a lacerated hymen, and occur as a rule on the posterior half of the vaginal surface; they develop occasionally an intense sensitiveness which leads to vaginismus and painful coition (dyspareunia). Treatment consists in either touching them freely with a Paquelin's cautery, or excising them thoroughly with scissors.

4. **Imperforate Hymen**—that is, complete closure of the vaginal slit below, by the hymen—is of great importance, although fortunately not common. The hymen is usually tougher and more cartilaginous in these cases, and hence cure by spontaneous rupture rarely occurs.

The cause is supposed to be due to inflammation producing adhesion during foetal life, the time of occurrence probably being at or after the fifth month of pregnancy; before puberty, as no menstrual flow occurs, no symptoms will arise indicative of its presence; when this epoch is reached and menstruation should occur, the patient will experience all the sensations of the flow periodically, but no discharge will appear; as each month comes round, there will be a recurrence of these sensations, becoming at last complicated by colicky pain, which lessens during the inter-catamenial periods. As time goes on, a swelling will appear above the symphysis pubis in the median line, the pains will become more severe and her general health will suffer; these symptoms will lead to a local investigation.

FIG. 55.



Hæmatokolpos.

What has taken place is as follows: at each menstruation a certain amount of bloody discharge finds its way into the vagina and remains there owing to the imperforate hymen; during the inter-catamenial period a small amount is re-absorbed; the same phenomena recur at each menstrual epoch, and the vagina gradually becomes distended (*hæmatokolpos*): the result is that the undilated uterus is pushed up out of the pelvis (Fig. 55); or, the cervix expanding, the uterus becomes filled with blood; in either case the swelling felt in the lower hypogastrium is the uterus (*vide* Fig. 75).

The vagina is distended with blood, owing to an imperforate hymen; the uterus is pushed up out of the pelvis, and the cervix is commencing to dilate passively. (After Schroeder.)

If the disease is unrelieved, blood accumulates in the Fallopian tubes, producing one variety of *hæmatosalpinx*, and finally finds its way into the peritoneal cavity, where gravitating into the posterior cul-de-sac it forms an intra-peritoneal *hæmatocele*.

On inspection of the vulva and drawing aside the external labia a bulging bluish purple tumour will be found, which is the distended hymen; if this be observed during the colicky pains, it will be found to distend up to a certain point, the greatest amount of protrusion being coincident with the acme of the pain; in a case

observed by the author, stretching of the perineum and dilatation of the anus occurred as in labour.

Treatment.—This consists in *very gradual* withdrawal of the fluid by perforation of the hymen; the distended uterus must have time to accommodate itself to the change of pressure; otherwise, if suddenly emptied, septic absorption from air entering into the dilated Fallopian tubes and reaching the peritoneum, would set up fatal peritonitis; collapse and uterine hæmorrhage may also occur.

There are three plans advocated: first, by making a valvular slit in the hymen, and allowing the tarry-coloured fluid to escape into antiseptic cotton-wool; secondly, by making an opening with Paquelin's cautery and inserting a strip of antiseptic gauze into the opening; or thirdly, by aspiration. No pressure upon the hypogastrium should be resorted to.

The fluid which escapes is of a tarry colour and treacle-like consistence; it contains no clots owing to the presence of mucus.

(B) Diseases of the Vagina Proper.

1. **Malformations.**—In studying this subject, it must be recalled that the vagina is formed by the fusion of the lower ends of the two Müllerian ducts (p. 29).

The Vagina may be absent, and this condition may exist either with a similar absence or ill-development of the uterus and its appendages, or with a normal condition.

The Vagina may be duplex—that is, a partial or complete antero-posterior septum may divide it; in the former case, the lower portion of the vagina is affected; a single or double uterus may co-exist with this condition. The presence of the septum may not be discovered until labour takes place, rarely in consequence of difficulty in coition.

The vagina and urethra may communicate, and then open by a common passage into the vulva.

Atresia of the Vagina may occur—that is, apart from the existence of an imperforate hymen the slit may be closed; the obstruction is usually in the lower third of the vagina, when we may get hæmatokolpos or pyokolpos (purulent collection in the vagina.)

The causes are:

1. Congenital defect;
2. Acquired: it may then be the result of sloughing and subsequent cicatrization after a difficult labour; or of the sloughing which occurs during the course of some of the specific fevers, such as scarlatina and small-pox.

The course and sequelæ would be in every way similar to those attending imperforate hymen, and the treatment to be carried out should be on the same lines; contraction is apt to recur, and great care must therefore be taken to make the patient wear a glass vaginal tube or bougie regularly, for some length of time after the operation. Adhesions may distort the vagina, but not necessarily produce complete atresia.

3. Artificial: in certain cases where a large and incurable vesico-vaginal or recto-vaginal fistula exists, a plastic operation is performed for the closure of the vagina; menstruation then takes place into the bladder or rectum, and seems productive of no harm, although attainment of the latter condition appears preferable.

2. Inflammations of the Vagina.

1. *Acute Vaginitis or Kolpitis*.—This is an acute inflammation of the mucous membrane lining the vagina.

Causation.—1. Gonorrhœa, which is the most common.

2. Traumatic: as the result of operations, ill-fitting pessaries, or these retained too long *in situ*; or powerful and caustic injections.

3. The discharges of cancer, or urine from a vesico-vaginal fistula.

4. Old age: at the menopause a well-marked form occurs to which is given the name of "senile" vaginitis, and which tends to become chronic.

5. Specific fevers, such as scarlatina and small-pox.

6. Infection by the dirty specula or instruments of the medical attendant.

Predisposing causes would include anything tending to depreciate the patient's general health, such as alcoholism or diabetes, and in certain cases menstruation and pregnancy.

A diphtheritic membrane has occasionally been observed on the vaginal mucous membrane accompanying the exudation on the tonsils.

Symptoms.—These come on rapidly, and consist of a bearing-down and a feeling of weight, with a dull, smarting pain located in the vagina: there is spasm of the rectum, bladder, and the vaginal orifice; slight pyrexia may occur, but this is not essential, and there is no initial rigor. If the urethral orifice and canal become implicated, bladder troubles will arise—*e.g.*, cystitis, &c.; vulvitis usually complicates acute vaginitis in adults; indeed, it is rare to find the two apart; it is unusual to meet vaginitis in the child, but vulvitis, on the other hand, is very common.

Deficient secretion at first is followed by free muco-purulent discharge, sometimes mixed with blood. There is a difficulty in

movement and general soreness of the external genitals. Cure takes place in from seven to fourteen days, or the disease may lapse into the chronic form.

Physical Signs.—The mucous membrane during the early stages is swollen, bright red in colour and velvety to the touch, and bleeds easily on handling. This is due to the papillæ becoming infiltrated with small cells, producing swelling and protrusion of the squamous epithelium, the upper layers of which are shed. The primary deficient secretion soon gives way to a copious mucopurulent discharge, which bathes the vaginal walls, and may often be squeezed out of the urethra.

The inguinal glands may be enlarged and tender; the labia swollen and puffy, and the urethra thickened.

A speculum is passed with difficulty owing to the swelling and pain, but it discloses red, inflamed points, scattered over the mucous membrane, the whole surface being bathed with pus. The secretion is acid and faint-smelling, and often offensive; it consists of large quantities of vaginal epithelium with mucus and pus-cells.

Possible Complications.—Urethritis and cystitis; the inflammation may spread to the cervix, the uterine cavity, and infect the tubes, ovaries and peritoneum; vulvitis, bubo and inflammation of Bartholin's glands.

The diagnosis as to the cause, whether specific or not, is naturally of the greatest importance, but experience shows us that, with one exception, this is quite impossible either from the characters of the discharge or from the nature of the symptoms. This exception is the presence of a gonococcus peculiar to gonorrhœa, which is considered as diagnostic.

Certain facts, however, may lead us to suspect gonorrhœa; they are the very sudden commencement of the disease, the marked involvement of the bladder, and the tendency to suppuration of the inguinal glands.

Moreover, it is important to bear in mind that should the patient's husband have even the slightest or most chronic gleet following an attack of gonorrhœa, it is capable of setting up a virulent form of acute vaginitis; a woman with acute non-specific vaginitis can communicate to the male a disease practically indistinguishable from gonorrhœa.

When much raw surface is exposed, adhesions are liable to be set up and a certain amount of atresia of the vagina may result. In old women, when vaginitis is of the recurrent subacute form, a similar contraction of the vagina may be produced.

A pelvic abscess, which is discharging pus through the vagina, must be carefully distinguished from vaginitis.

Prognosis.—In the non-specific form, good ; in the specific, unfavourable, especially if there is a tendency to spread upwards.

Treatment.—Rest and cleanliness are of every importance. Most cases of simple acute vaginitis will get well with time and plain warm vaginal douches.

(a) In the early stage, and when there is much pain, decoction of poppies, $\bar{3}j$ to the Oj of hot water (temp. 100° F.), given as an injection, produces much relief ; sitting in a warm hip-bath, and sponging the vulva with hot water, may also be resorted to with benefit. A morphia suppository is occasionally necessary.

No drug seems to have any specific effect on the gonorrhœal form, as in the male, so that the exhibition of copaiba and other resins is not called for ; a saline and slightly aperient mixture should be taken regularly.

R	Magnes. Sulph.	.	.	.	.	.	.	gr. xx
	Magnes. Carb.	.	.	.	.	.	.	gr. xv
	Potass. Nit.	.	.	.	.	.	.	gr. x
	Aquam.	.	.	.	.	.	.	ad $\bar{3}j$.

Two tablespoonfuls thrice daily.

If cystitis be present, warm demulcent drinks and barley water must be ordered, and a mixture as follows :

R	Potass. Bicarb.	.	.	.	.	.	.	gr. xv
	Potass. Bromid.	.	.	.	.	.	.	gr. viij
	Tinct. Hyoscyami	.	.	.	.	.	.	$\mathfrak{m}.$ xl
	Inf. Buchu	.	.	.	.	.	.	$\bar{3}j$

Two tablespoonfuls every three hours.

(β) As the acute stage wears off and a free muco-purulent discharge becomes the prominent symptom, more stimulating applications are required.

These may be applied—(1) By injection ; (2) By painting the vaginal surface ; (3) By means of medicated pessaries.

(1) The folds of the vagina prevent the mucous membrane of the sulci being touched by the various injections ; this is the reason of their failure under certain circumstances. A solution of boracic acid is bland and unirritating ; acetate of lead, $\bar{3}j$ ad Oj ; copper sulphate, gr. xx ad Oj ; zinc carbolate, gr. xxx ad Oj ; and zinc sulphate, gr. xxx ad Oj , may also be tried in rotation ; douches if given carelessly may cause the purulent discharge to penetrate into the cervix and even uterine cavity. Alum has been advocated, but it produces a curdling of the discharge, which is an unpleasant effect.

(2) The application by means of cotton-wool through a Sims's speculum, of a 1 in 1000 solution of corrosive sublimate. This

is a very painful proceeding and requires anæsthesia. The patient should be placed in the dorsal position and the vaginal walls thoroughly rubbed over with the solution. It is occasionally advisable to keep the inflamed vaginal walls apart; this is best done by means of a cotton-wool tampon soaked in the above glycerine and bismuth solution, after the vaginal walls have been carefully cleansed of their purulent secretion.

(3) Medicated vaginal pessaries are introduced into the vagina, and allowed to melt; their contents thus come into contact with every portion of the mucous membrane. Excellent examples are:—Tannin, gr. x; gallic acid, gr. x; oxide of zinc, gr. xv; borax, gr. xv; or salol, gr. iss.; made up with cacao butter, a material which quickly melts at the temperature of the body.

2. *Chronic Vaginitis*.—In this condition the discharge is the prominent symptom.

Character of the Discharge (Leucorrhœa).—It has a faint and peculiar odour, and is of the consistence of thin cream; it is acid in reaction, and consists of vaginal mucus-cells, breaking-down pus cells, blood globules, and fatty matter. This form is frequently the sequel of an acute attack, and must be treated as above by astringents. But there are certain constitutional states which are productive of the discharge: they are, anæmia, gout, and any cause depressing the system generally; over-worked factory and school-girls and over-suckled and parturient women are frequent subjects of this complaint. Great care must be taken to eliminate uterine and cervical leucorrhœa. The chief symptoms are backache, general feeling of weakness and sensation of bearing-down; these may all occur in a virgin, and should then never be treated locally.

Treatment consists in tonics, chiefly iron, exercise, plenty of fresh air, and local cleanliness.

Vaginal Abscess may arise from breaking down and suppurating blood-clot in the vaginal wall, chiefly after difficult labour or from a suppurating vaginal cyst. Treatment by incision and drainage is the only satisfactory method of cure.

3. *New Growths* may be—

- (a) Cystic; or,
- (β) Solid: Carcinoma,
Sarcoma,
Fibroma,
Tuberculosis.

(a) Cysts are usually found on the lower third of the anterior vaginal wall. They arise in various ways—either *congenitally*, from dilated remains of Gärtner's duct or persistent remains of the Müllerian ducts; or *accidentally*, from a dilated mucous gland of the vaginal mucous membrane, or from an extravasation of blood

becoming cystic; lastly, the glands of Bartholin may become cystic and project upwards. They contain a clear serous fluid, which may undergo purulent change, one form of vaginal abscess being produced in this way. The cavity is lined by a single layer of cylindrical epithelium. They rarely give rise to symptoms, unless they suppurate or form an obstruction to coitus.

Treatment consists in making a free incision, swabbing the interior over with tincture of iodine, and keeping the orifice patent; healing must take place from the bottom of the cavity.

(β) **Carcinoma and Sarcoma** as primary growths are extremely rare; they occur more commonly as secondary growths, spreading downwards from the uterus. Pain, hæmorrhage, and fetid discharge are the chief characteristics of them both. The inguinal glands are enlarged if the lower third of the vagina is affected.

Treatment is useless in the secondary form; in the primary disease free excision should be resorted to, but recurrence is frequent.

4. *Lacerations* after the use of instruments, prolonged labour with consequent sloughing, and violent coitus, may open a passage into the surrounding organs, producing so-called *fistulæ*; the peritoneal cavity has been opened in rare cases.

Vaginismus.

By this term is meant a painful reflex spasm of the muscles situated around the vaginal orifice, rendering coition difficult or impossible; the levatores ani and the bulbo-cavernosus muscles (p. 6) seem to be chiefly concerned. The spasm is set up by the slightest attempt at sexual intercourse or digital examination; sometimes even the friction of walking will produce it. The spasmodic condition may be limited to the vaginal orifice, or it may extend in bad cases to the whole body.

There are two distinct classes of cases in which it occurs:

1. Those in which no local cause can be found, and which are purely neurotic in origin: in these cases the spasm may come on before any contact has occurred, simply owing to the dread of pain, which amounts in some to a monomania. Allied to this condition are cases of painful micturition and defecation without local cause, occurring in nervous and hysterical girls.
2. Those where some painful local condition is found on examination.

Under this heading we may include :

Vulvitis and vaginitis.

Tender spots and fissures on the vulva, chiefly upon the vestibular space.

A tender or rigid hymen, or inflamed carunculæ myrtiformes.

An extremely narrow vagina.

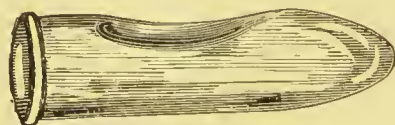
Urethral caruncle.

Hæmorrhoids or fissure of the anus.

Symptoms.—Dyspareunia (painful or impossible coition), accompanied usually by sterility and general depression of the bodily health ; development of nervous ailments, may result at a later period.

The Treatment in the first class is extremely unsatisfactory ; over-dilatation with the thumbs of the vaginal orifice, the patient being deeply under an anæsthetic, may be successful in some cases ; time and gentle moral treatment doubtless cure others ; absolute sexual rest should be insisted upon, and the usual sedatives locally and generally ordered.

FIG. 56.



Glass vaginal dilator.

With shallow concavity to obviate pressure upon the urethra.

In the second class accurate diagnosis of the local cause is absolutely essential. The painful spot should first be made out by means of a blunt probe, an anæsthetic should then be given, and the whole vaginal orifice and vulva examined for any fissures or caruncles which may exist. These should be freely touched with a Paquelin's cautery, and the thumbs being placed back to back in the vaginal orifice, thorough dilatation performed ; the vaginal dilator should be subsequently worn at intervals (Fig. 56).

Parturition often cures these cases, though not all, even if an extensive perineal laceration has occurred.

Dyspareunia may result from many other conditions, and is not necessarily accompanied by vaginismus.

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CHAPTER X.

LACERATIONS AND DISPLACEMENTS OF THE PELVIC FLOOR.

A. Lacerations of the Pelvic Floor.

IN the chapter on the anatomy of the pelvic floor it was mentioned that the two segments (sacral and pubic) were separated by a slit, the vagina; that the pubic segment is slightly drawn up or stationary during labour, while the sacral segment is pressed down and distended during the passage of the head through the vulva.

The Lacerations occurring in the pubic segment are confined to the vestibule and the region around the urethral orifice: they are as a rule few and unimportant.

On the other hand, tears of the sacral segment are numerous, and are usually included under the term "rupture of the perineum."

They include the following injuries to the *vulval* outlet:

1. Laceration of the fourchette, and, if not already ruptured by coition, the hymen: the tear is usually mesial, and posterior, and has been termed the "inevitable laceration."
2. Tears across the labia minora, completely dividing their substance, or only partially.
3. Lacerations of the perineal body, which may extend:
 - (a) Up to the sphincter ani, involving the vaginal mucous membrane, the point of fusion of the bulbo-cavernosus and the transverse perineal muscles and the levator ani (a few fibres);
 - (b) Through the sphincter, producing a common cloaca, or recto-vaginal outlet;
- and 4. The injury to the vaginal canal, called *central* rupture of the perineum, which may occur in three forms:—
 - (a) As a rupture through the mucous membrane of the vagina only (Fig. 57, a); or

(β) Through the external skin only (b); or

(γ) As a complete rupture through the mucous membrane, muscles and external skin (a, c, b).

It is not necessary for a portion of the fœtus to pass through the central rupture, but it is produced by over-stretching of the vaginal wall; the perineal body is pierced through its centre, and there is a band of tissue of greater or less thickness (b, d) between its anterior edge and the scaphoid fossa.

This condition may be produced by sloughing a few days after labour.

The Causes of Ruptured Perineum are chiefly obstetrical, and, apart from local rigidity, are:

- (1) Careless use of forceps;
- (2) Occipito-posterior presentations;
- (3) The posterior shoulder of a large child in a vertex presentation;
- (4) The after-coming head.

Central rupture may be the result of violent labour pains on an undilated vagina, as in primiparæ, with albuminuric convulsions. It may be necessary to enlarge the vulval opening in removal of large fibroid polypi or total extirpation of the uterus; posterior or lateral incisions are then made.

Symptoms attending complete rupture are:

1. Incontinence of fæces, often diarrhœa;
2. Involuntary passage of flatus;
3. Difficult sitting and locomotion;
4. A sensation of dropping of the pelvic floor.

A symptom attending partial rupture may be slight feeling of bearing-down, or the patient may experience nothing untoward.

Treatment—

1. Immediate suture—*i.e.*, suture by catgut or silk at the time of labour;
2. Remote suture—*i.e.*, later, when the patient is about, and has quite recovered.

1. **Immediate Suture.**—The patient is placed upon her back, a douche of 1 in 4000 perchloride given, and the vagina stuffed with antiseptic gauze, to prevent the lochial discharge obscuring the operator's vision: the wound will then be found to be irregular,

FIG. 57.

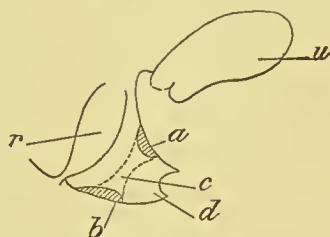


Diagram of perineal lacerations (central).

- a. Through vaginal mucous membrane only.
- b. Through external skin only
- a, c, b. Complete central rupture. d. Fourchette.
- r. Rectum. u. Uterus.

and proceeding from it a profuse venous and arterial bleeding : this must be stayed by Spencer Wells's artery forceps and hot sponges, and the sutures passed, as is described at page 120. All oozing must cease before closure of the wound : union is usual in these cases ; the course of the puerperium need not be changed in any way.

2. **Remote Suture.**—This is necessary when there has been complete laceration through the sphincter ani, or when the rupture is extensive enough to prevent a ring pessary staying in the vagina, and repair is thought advisable as a preliminary.

The operation should not be performed until six or eight weeks after labour, and when a woman has been for a change and is in a good state of health. The urine must be free from albumen and sugar.

The proceeding adopted in *complete laceration* of the sphincter will be described, as it includes the minor laceration and its curative plastic operation. The operation must be divided into three distinct stages, the details of all of which should be scrupulously attended to :

- a. The preparation of the patient ;
- b. Actual operation ;
- c. After-treatment and management.

(a) **Preparation of the Patient.**—The most appropriate time for commencing this is shortly after menstruation and immediately after a change of air : for seven days the patient is put on to light food—fish, milk, and eggs. A purge of aloes, cascara and belladonna, such as :

R Aloin	gr. j
Extr. Casc. Sagr.	gr. iss
Extr. Bellad.	gr. ʒ

Fiat pil.

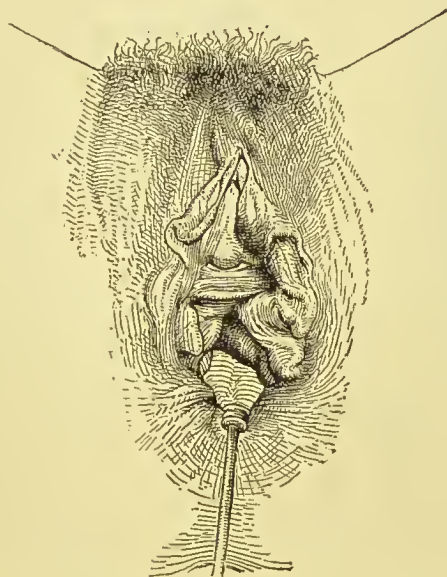
is given every night and of sufficient amount to produce a liquid motion twice daily* ; by this means any scybalæ present in the large intestine are got rid of : for twenty-four hours before the operation nothing but milk and barley-water should be allowed, and absolute rest in bed is imperative. An antiseptic douche must be given twice daily of 1 in 4000 for seven days ; if there is much leucorrhœa, a glycerine pledget night and morning should be introduced. Sore spots and cicatrices may be smeared with cocaine ointment. Immediately before the operation an enema should be given : if this does not act, when the patient is anæsthetised the rectum must be swabbed out, and any scybalæ removed by a scoop or the handle of a spoon.

(b) **The Operation.**—The patient must be placed in the dorsal

position, with the nates well over the edge of the operating table: a Clover's crutch is better applied to the legs. A chloroformist and two assistants are necessary.

Inspection of the Parts.—This shows us a gaping vaginal orifice (Fig. 58), with the rectal opening altered in shape—viz., like an isosceles triangle (Fig. 62, *a*, *c*, *b*) with a semi-circular corrugated base: the sides of the triangle are the edges of the rectal tear, the base the outline of the retracted sphincter, the ruptured ends of

FIG. 58.



View of genitalia in complete perineal rupture.

The patient is in the dorsal decubitus, and a cotton wool pledget has been inserted into the rectum to show the edges of the recto-vaginal septum. (From a photograph.)

which (Fig. 62, *a*, *b*), are separated and situated at the inferior angles of the triangle. The edges of the rent may not be so straight as they are represented in Fig. 62; this is due to a bulging of the rectal mucous membrane; a pile may also interfere with the theoretically triangular appearance. If the left forefinger be now passed into the rectum, with its palmar surface directed upwards, the edges of the rent will be better seen and felt.

The primary object of the operation is to bring the torn edges of the sphincter together.

The first step is to get a raw edge; for this purpose two modes of procedure have been followed:

1. By paring—*i.e.*, removing pieces of mucous membrane from the surface until sufficient is bared for the purpose;
2. By flap-splitting, or Lawson Tait's method.

The former will be described first.

Instruments required are :

FIG. 59.



Spencer Wells's forceps with hinge to permit of separation of the two portions for cleaning.

FIG. 60.



Hagedorn's needle-holder (with needle *in situ*).

FIG. 61.



Hagedorn's needles.

1. Sharp-pointed, long-handled scissors, slightly curved on the flat (Fig. 100);
2. Long dissecting forceps with toothed points and supplied with a catch or not;
3. Spencer Wells's artery forceps (Fig. 59);
4. Hagedorn's (Fig. 60) or Spencer Wells's needle-holder;
5. Needles of various curves (Fig. 61).

The surface to be bared should be marked out and have a somewhat reniform appearance (Figs. 62 to 65).

One assistant places his finger in the rectum and distends the rectal wall, or the operator may insert his own left forefinger.

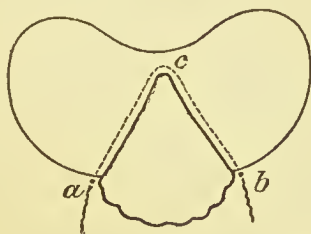
The mucous membrane is seized with the toothed forceps at

the operator's right-hand end of the sphincter muscle, and the scissors are pushed into the submucous tissue; they can then be passed between the superficial and deep structures quite easily.

Paring should then be done by removing strips of mucous membrane from right to left, the finger in the rectum guiding the operator. The rectal edges are then freshened, and the whole surface necessary will thus be denuded.

More or less bleeding will take place; any arteries should be seized by Spencer Wells's forceps, which must be left attached for the time being. Venous oozing is stayed by application of sponges wrung out in *very hot* water (115° – 120° F.). After hæmorrhage has ceased, we proceed to pass the sutures: first the rectal rent must be closed; this may be done in two ways:

FIG. 62.

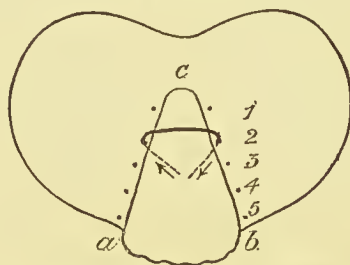


Purse-string suture inserted.

- a, b.* Torn ends of lacerated sphincter ani.
c. The upper limit of the tear in the recto-vaginal septum.

The dotted line represents the course taken by the suture. The reniform space is raw surface. (From a photograph taken during operation.)

FIG. 63.



Interrupted suture for restoring sphincter ani and recto-vaginal wall.

1, 2, 3, 4, 5, points of insertion of sutures. Suture 2 has been passed; the arrows show the direction taken by the needle.

a, b, c, as in Fig. 62.

(From a photograph.)

1. By the so-called purse-string suture (Fig. 62);

2. By the interrupted and buried suture (Fig. 63).

1. In the former, the needle in its holder, and threaded with fine chromic catgut, is entered at the point *b* (Fig. 62); it is passed up parallel with one side of the rent to the apex of the triangle *c*, and then brought down the other side and out at *a*, having thus been buried along its whole course; the two ends are tied tightly; the points *a* and *b* are thus approximated and the sphincter reformed (Fig. 64, *a, b*).

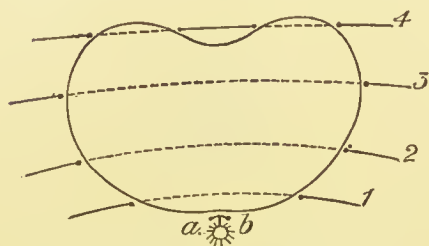
2. The latter is more satisfactory, and consists of passing sutures *from below*, through the rectal wall, carrying the needle *over* the laceration, through the rectal wall on the other side from

above downwards (*vide* Fig. 63: 2). Four or five of these are passed, each being tied before the passage of the next, and the sutures will be found to be buried in the rectal wall, the knots lying in the rectum itself. The last suture (5) is of great importance and should be carefully tied. If the *little* finger is passed into the newly made sphincter it will be found to grasp it tightly. The needle may be the ordinary three-eighths of a circle curve, and the needle-holder Spencer Wells's. Many prefer Hagedorn's sickle-like needle (Fig. 61), which can only be introduced by his specially-made holder (Fig. 60).

The most important part of the operation, so far as the patient's comfort is concerned, is now finished, and the raw surface has the same extent as when the perineal body is ruptured *up to*

but not through the sphincter ani. Taking the bared, kidney-shaped surface, silk, silver wire, or silkworm gut may be passed in the following way, with either a half-curved or straight needle: the needle point is entered on the skin surfaces close to the raw edge, and is pushed across the perineum *beneath* the raw surface, emerging on the skin on the opposite side (Fig. 65, I.); the left forefinger must be kept in the rectum, with palmar surface towards the needle to prevent it perforating the bowel. Sutures IV.,

FIG. 64.



Purse-string suture tied and anus made.

1, 2, 3, 4. Perineal sutures passed. 4 emerges in the centre of its course before again becoming buried. *a* and *b* have been approximated.

(From a photograph.)

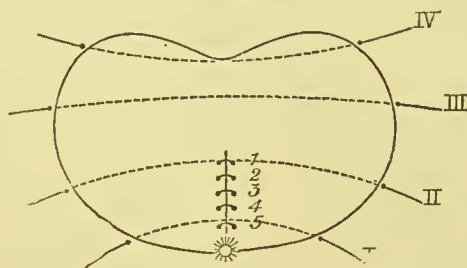
III., and II. are thus passed: suture IV. may emerge on the mucous membrane projection (Fig. 64: 4), and remain visible until it enters the raw surface on the other side.

Nothing further should be done until bleeding ceases; the Spencer Wells's forceps can now be taken off, and if the surface remains fairly dry, an antiseptic douche may be played over the wound and the sutures can be tied or the wires twisted. Any blood flowing after the co-adaptation of the flaps, clots, breaks down into pus, and destroys any union. As the sutures are being secured the legs must be brought together and tied at the knees. The sutures must not be tied too tightly; only practice, however, enables the operator to gauge the proper amount of tension; it must be remembered a certain amount of swelling always follows the operation. If there are any edges not quite in apposition, it is

well to insert a superficial catgut stitch. The wound is now dusted over with iodoform powder, the urethral orifice shown to the nurse in attendance, and a wood-wool diaper applied by means of a T-bandage. The patient is then put to bed on her back or side, with her knees supported by a bolster. No morphia suppository should be given.

(c) **The After-management of the Case.**—No opium or alcohol should be given. If vomiting comes on after the anæsthetic, the nurse should support the perineum with her hand flat on the diaper. No food is necessary for at least twelve hours, then only barley-water and milk, a teaspoonful at a time. Fluid diet should be administered for twenty-four hours after the operation: gruel and bread and milk on the second and third day. A purgative of the same composition as was given before the operation must be administered on the night of the third day; castor-oil is another

FIG. 65.



Sphincter ani and recto-vaginal wall repaired.

I., II., III., IV. Perineal sutures inserted. (From a photograph.)

form, but is often objected to; the compound liquorice powder in 3j doses is useful. It was formerly customary to keep the bowels quiet until the sixth or seventh day, but it was found by experience that the scybalæ tore open the recently healed tissues and produced a failure; the object of the more modern treatment is to get early and liquid motions.

The sutures should be removed on the tenth day. The catheter must be carefully passed by the nurse every four hours, and lie in antiseptic fluid when not in use. Flatus may be relieved by passing a catheter into the rectum, keeping it carefully pressed along the posterior rectal wall during introduction.

2. The operation by flap-splitting is a much simpler and shorter process, but an accurate or comprehensible idea of it cannot be given in writing: it must be seen to be understood.

The recto-vaginal septum is split transversely by scissors, and the raised flap is utilised in the formation of the new perineum.

The advantages of this operation are—

1. Rapidity of performance ;
2. There is no loss of tissue, so that the operation can be repeated without encountering cicatrices resulting from the former attempt.

The only disadvantage the author has found in its results, is that it is apt to make too thin a perineum.

The treatment of *complete* central rupture is to syringe out the rent with antiseptic solution and blow iodoform into it. It will usually heal up by granulation ; occasionally a fistulous track is left which should be treated by a probe covered with cotton-wool, and dipped into tincture of iodine, and passed from time to time into it, to stimulate healing. It is only occasionally that a central rupture requires operative interference for cure.

B. Displacements of the Pelvic Floor.

(1) **Excessive Bulging of the Pelvic Floor.**—This is when the are produced by the projection of the pelvic floor measures on straining more than four and half inches (p. 25). This is attributed to the laceration during parturition of the levator ani muscle without any external wound ; as a consequence, the rectum, vagina, and pudendum project downwards.

The patient complains of a feeling of laxity and dropping of the whole pelvic floor ; the rectum, being influenced by the damage to the levator ani, becomes torpid and constipation results ; bladder irritation occurs. The treatment so far is unsatisfactory ; an abdominal belt with a perineal pad attached to it serves, however, to give the patient support.

(2) **Prolapse of the Vaginal Walls.**—This must be looked upon as a form of true hernia, through the vaginal slit in the pelvic floor. The anterior wall may come down first with the posterior attached bladder wall, and form what is called a cystocele ; or the posterior may do so with the anterior rectal wall, and form a rectocele ; both are increased on straining from addition to the intra-abdominal pressure.

Prolapse of the vaginal walls is usually considered as an early stage of prolapsus uteri.

(3) **Prolapsus Uteri** is a hernia of the pelvic floor at the site of the vaginal slit, and may be called a “sacro-pubic” rupture. The chief cause is increased abdominal pressure, often acting on a weakened pelvic floor, as, for instance, in (a) recent dilatation after labour ; (b) injury to the levator ani muscle during parturition.

A chronic cough, straining at stool, or lifting under these conditions would tend to produce the prolapse.

Beyond the fact that a heavy uterus may predispose to prolapse, it has nothing to do with causation of the accident: as has already been said, prolapsus uteri is a form of rupture, as is inguinal hernia, of which the sac is the peritoneum, and the passage through which it travels, the outlet of the pelvis, which is bounded by the symphysis pubis in front, the "sacral segment" behind, and the obturator internus and levator ani muscles laterally.

The coverings are formed by the uterus, and the anterior vaginal wall in front, the posterior vaginal wall behind (Fig. 66). Intestine is always contained in the sac of a prolapse.

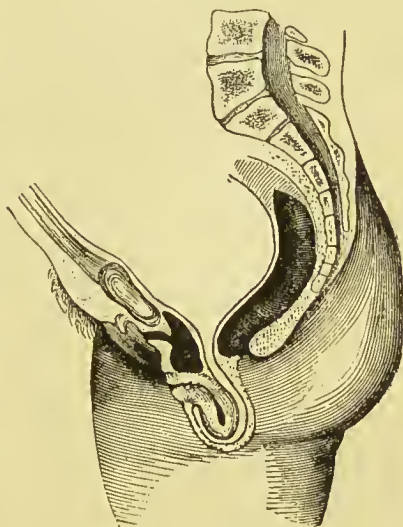
Prolapsus uteri may be (*a*) partial; (*β*) complete, when the term *total procidentia* is given to it.

Meehanism of Prolapse.—If a woman with complete prolapse of the uterus and vaginal walls is placed on her left side and the mass reduced, and if she is then told to strain, the prolapse will return and pass through the following stages:—

The anterior vaginal wall appears first at the vulva, with the posterior bladder wall as a cystocele; with the bladder come the ureters; the urethra will be sharply curved on itself. The cervix then appears, and lastly the posterior vaginal and often rectal wall, as a rectocele: the cervix now passes downwards and forwards towards the symphysis, its orifice looking forwards; total eversion of the

posterior vaginal wall then takes place; the most *posterior* portion being extruded first. Considering this process more closely, we find that the cervix follows in its descent the curve of Carus, and that the long axis of the uterus corresponds with that of the pelvic cavity: as it descends, gradual retroversion therefore takes place of the fundus uteri, and it is prolapsed in a state of complete retroversion; above the uterus, and forming a pouch behind it, is the peritoneum and displaced intestine. Replacement must be performed in exactly the opposite way. Prolapse of the posterior vaginal wall is not of necessity a complication of prolapsus uteri.

FIG. 66.



Total prolapsus uteri.

The uterus in a state of retroflexion: the intestine, which should be present in the sac, has been purposely omitted. (After Schroeder.)

The uterus is usually enlarged in these cases, and may be accessory to the production, but is not a direct cause of prolapse.

Causes of Prolapsus Uteri.

Direct.—1. If we consider the utero-sacral ligaments and the anterior vaginal wall as the chief supports of the uterus, any weakening or relaxation of the pelvic floor, such as stretching of the utero-sacral or broad ligaments and the levator ani, as after labour, will be an important cause.

2. Increase in the intra-abdominal pressure, as by chronic cough, constipation, tight-lacing, or hard work, as washing.
3. Prolapse of the vaginal walls.
4. Traction from below by instruments—*i.e.*, application of forceps with an undilated cervix, or volsellæ to the cervix in supra-vaginal amputation.
5. Atrophy of the parts in old age.

Indirect.—1. Increased size of the uterus, as from fibroids or sub-involution.

2. Injury to the perineal body (lacerated perineum).

Symptoms.—In the incomplete or partial prolapse, the patient may have bearing-down and weight in the pelvis worse on standing or exertion, irritation of the bladder and constipation, menorrhagia and leucorrhœa; she is usually easier lying down. In the complete form, she feels many of the above symptoms, and has in addition the inconvenience of a large extruded mass, preventing her either sitting or walking in comfort: the urethra being distorted and a cystocele present, much vesical and urinary trouble results.

The extruded mass is subject to pressure, and the mucous surface becomes skin-like and ulcerates in places, giving rise to fetid discharge and hæmorrhage.

Diagnosis.—The only condition likely to be mistaken for early prolapse is hypertrophic elongation of the cervix (Fig. 76): in this latter, the sound usually passes beyond the normal owing to increased length of the cervix, but the fornices are normally situated: in a prolapse, the sound may pass farther than normal, but the fornices are obliterated, and examination by rectum allows the finger to be pushed into the sac of the rectocele, while by means of the sound the posterior bladder wall is found to be partially prolapsed (cystocele).

Treatment.

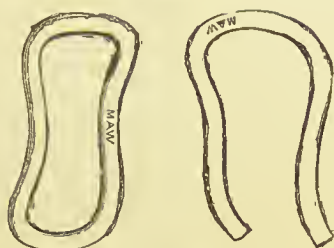
1. Palliative;
2. By pessaries;
3. Operative.

1. **Palliative** is especially useful shortly after labour, and where the prolapse is slight: rest in bed, with the hips raised and hot-water douches with inf. quassia or decoct. quercus often complete a cure. A form of iron should also be given; treatment must be prolonged over six weeks at least.

2. By Pessaries.

A Hodge (Fig. 67), by pushing up and stretching the posterior cul-de sac, is a very effective means when the prolapse is incomplete (for method of introduction, *vide* p. 150): a ring pessary may also be applied (Fig. 68). Occasionally rupture of the perineum is extensive and

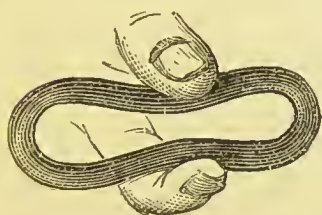
FIG. 67.



Hodge's pessaries.

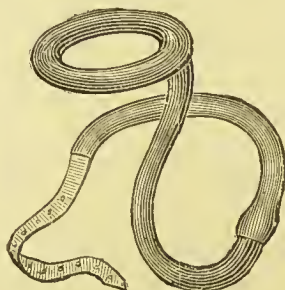
Lever form. Open lever form.

FIG. 68.



A Watch-spring ring pessary held ready for introduction.

FIG. 69.



Cutter's ring.
The strap is attached to an abdominal belt.

FIG. 70.



A cup and stem pessary.

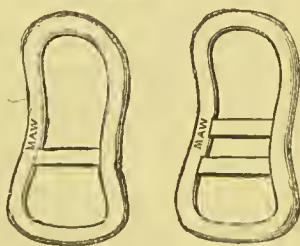
With elastic cords attached to an abdominal belt.

no pessary can be kept in, then the perineum should be repaired as a preliminary to introduction of the pessary.

Dilated air pessaries are on a wrong principle, although often very serviceable; Cutter's ring with a belt may succeed where all other pessaries have failed (Fig. 69); *senile* procidentia is best relieved by a cup and stem (Fig. 70).

Greenhalgh's pessary (a Hodge with one or two crossbars) serves to support the prolapsed bladder (Fig. 71). Zwancke's pessary — an instrument which is expanded after introduction, although temporarily successful, fre-

FIG. 71.



Greenhalgh's pessaries.

With one and two crossbars for cystocele.

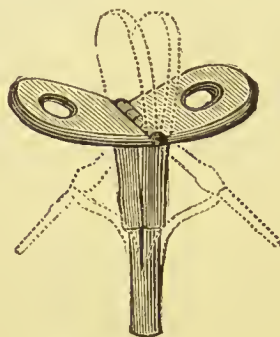
quently gives rise to extensive sloughing, and must therefore be considered dangerous (Fig. 72).

3. Operative.

1. Those operations which have for their object the narrowing of the calibre of the vaginal canal.

i.e. Elytrorrhaphy, where redundant portions of vaginal mucous membrane are excised and the edges brought together.

FIG. 72.



Zwancke's pessary.

The dotted outline indicates its shape during introduction ; the shaded portion its appearance *in situ*.

2. Those which have for their object the addition of suspensory power to the ligaments.

i.e., Alexander-Adams operation for shortening the round ligaments. This is performed by making an incision over the external abdominal rings and pulling the ligaments through ; they are then firmly stitched into their new position ; and Hysteropexy, where the abdomen is opened and the uterus sutured to the posterior surface of the anterior abdominal wall.

It may be said generally of all operative measures that they may succeed temporarily, but the author has never met with a case in which recurrence did not take place before the lapse of two years.

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CHAPTER XI

AFFECTIONS OF THE UTERUS.

By the term uterus is meant the body and the cervix. The diseases which may affect it vary with the age of the patient; developmental errors will become evident at puberty; from puberty to the menopause (which is the child-bearing period) there are all the accidents which may happen as a consequence of pregnancy and labour as well as the inflammations and formations of new growths apart from these conditions; from the menopause onwards everything tends to atrophy and physiological activity to decline.

It will be convenient to divide this subject as follows:—

- I. Malformations of the uterus proper.
- II. Atresia, stenosis, hypertrophy, and laceration of the cervix uteri proper.
- III. Inflammatory diseases of the uterus, cervical and corporeal endometritis. Metritis.
- IV. Sub-involution and super-involution.
- V. Uterine displacements.
- VI. Fibroid tumours; fibro-cystic tumours. Polypi.
- VII. Malignant disease; Deciduoma Malignum.

I. Malformations of the Uterus Proper.

The chapter on the development of the uterus must be recalled, and the important fact that the vagina, uterus, and Fallopian tubes are formed from the two Müller's ducts. Normally these remain separate in their upper portions from the tubes, but coalesce lower down, producing a single uterus and vagina (p. 29).

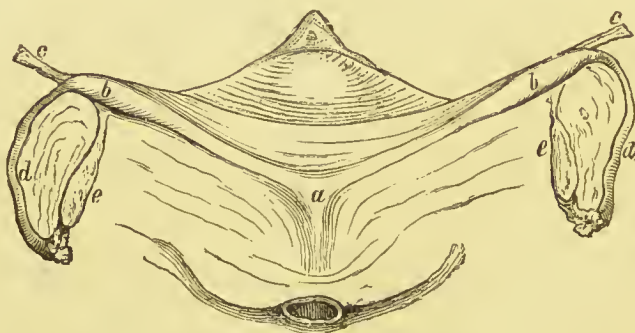
1. **Entire absence** of the uterus is extremely rare; in this variety the bladder and rectum are in contact, and the round ligaments are lost in the tissue between these viscera; the finger in the rectum and the sound in the bladder enable us to suspect this condition. Nothing but a post-mortem converts this suspicion into a certainty. The tubes and ovaries are usually absent. A *rudimentary uterus* may exist, and be felt as a thickening of

the posterior wall of the bladder; a true Douglas's pouch is formed between the uterus and rectum; the ovaries and tubes may be present and fully developed, while the vagina may exist or be absent (Fig. 73).

Patients with the above conditions do not as a rule menstruate, although they have certain sensations as of its onset at regular intervals: they may have well-developed breasts and pubic hair, or the breasts may be of masculine type and the voice harsh.

2. **One-horned Uterus (U. Unicornis).**—This is a condition in which one Müllerian duct only has become fully developed, the other being entirely absent or atrophied. The former has its ovary and Fallopian tube attached to it; if the rudiment of the

FIG. 73.



Rudimentary uterus (from behind).

- | | | |
|---------------------|--------------------|---------------------|
| a. Uterus. | b. Uterine cornua. | c. Round ligaments. |
| d. Fallopian tubes. | | e. Ovaries. |

The rectum is cut across and the posterior cul-de-sac is seen in front of it; the bladder is anterior. (After Schroeder.)

duct is present on the other side, its ovary and tube are also usually developed. Unless pregnancy takes place, this condition may exist without the patient or even her medical man being aware of it; if this unfortunately occurs, it progresses up to a certain period as in a true Fallopian pregnancy, and may then rupture, with often a fatal result.

3. **Double Uterus.**—This may exist under three different forms, and is due to development of both Müllerian ducts; we may have

(a) **Uterus didelphys**, where the uterus and vagina resulting from one Müllerian duct are completely separate from those developed from the other; they lie side by side and appear double externally as well as internally; this condition is extremely rare.

(β) **Uterus septus**, where there is a central antero-posterior

septum, which may or may not be continued into the vagina (Fig. 74). The cervix is therefore single or double. No external indication of the malformation exists.

(γ) **Uterus bicornis** (Two-horned uterus).—The uterus has two cornua and one cervix; a sulcus usually divides the former and indicates the nature of the condition present.

In all the above, tubes and ovaries are usually present and fully developed. So-called cases of super-fœtation are found to be cases of pregnancy in double or two-horned uteri.

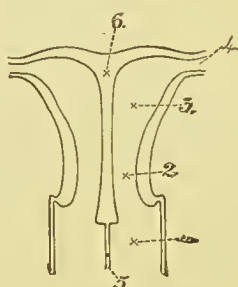
4. **Infantile Uterus**.—In this condition the uterus is normally formed at birth, and has its usual relation to the cervix as to length; but as the girl grows the body retains its infantile size, and at puberty we have a cervix $1\frac{1}{4}$ in. long, while the uterine body is scarcely an inch: the whole uterus and cervix taken together is smaller than normal. The ovaries are ill-developed, and puberty appears very late or sometimes not at all.

A variety of this is the so-called *congenital atrophy*, where the whole uterus is smaller than normal, but where the relative proportion of cervix to body is maintained. It is an instance of lessened local nutrition, and is usually found in the anæmic or ill-nourished patient; the cervix projects but slightly into the vagina, the uterine walls are thin, and the fundus acutely anteфлекed on the cervix.

The chief symptom, if menstruation appears, is dysmenorrhœa, which unfortunately tends to get worse as the patient becomes older: generally an early menopause is to be expected; sterility is the rule.

The only local remedy which has proved of avail in the author's hands has been galvanism at intervals; any resort to intra-uterine stem-pessaries cannot be recommended; removal of the ovaries to stay menstruation has been carried out in cases of great dysmenorrhœa.

FIG. 74.



Uterus septus.

With complete uterine and vaginal divisions.

1. Vagina of one side.
2. Cervix " "
3. Uterine cavity of one side.
4. Fallopian tube " "
5. Septum between vaginae.
6. " " uteri.

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Imlach.—"Double Uterus with Fibroid." (*Brit. Med. Journ.* 1885, ii. p. 695.)

Turner.—"Malformations of the Organs of Generation." (*Edin. Med. Journal*, 1864-5, vol. x. pp. 575, 687; 1866, vol. xi. p. 971.)

II. The normal shape of the Cervix has already been alluded to in Chapter i. p. 8; there are three abnormalities which must be described: they are—

1. Congenital.

(a) "Conical" cervix;

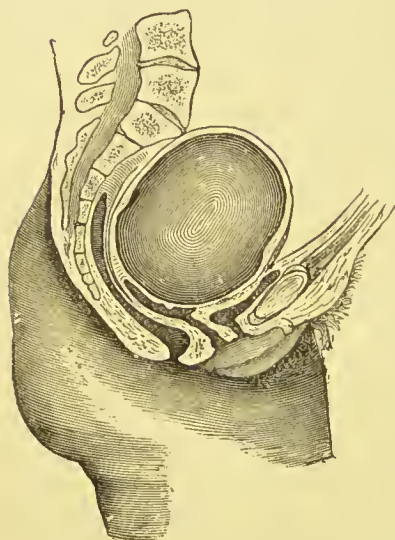
(β) Hypertrophic elongation of the vaginal or supra-vaginal portion of the cervix.

2. Acquired.

(γ) Lacerations of the cervix.

(a) **Conical Cervix** is usually associated with a circular or small external os uteri, instead of the transverse slit: the opening may be so small as to barely admit an ordinary surgical probe; this constitutes the so-called "pin-holed" os uteri. The cervix projects more than normal from the vaginal roof, and is of less elastic consistence than in the healthy state; it is in addition more likely to tear in any operations undertaken for its dilatation.

FIG. 75.



Hæmatometra.

Uterus distended with blood.
(After Schroeder.)

It will be convenient in this place to speak of stenosis or contraction, and its extreme, atresia or complete obstruction of the cervical canal.

Stenosis of the cervical canal as a congenital defect is by some thought not to exist; it is more common as an acquired form, and is usual at or about the external os uteri. It occurs as a secondary result of cicatrisation after bad labours or after the application of nitric acid or nitrate of silver to the mucous membrane of the cervix; acute inflammation is produced and consequent adhesion: atresia is not uncommonly the result of amputation of the cervix or incision of the internal os uteri, and may be associated with chronic cervical catarrh.

If complete atresia is present, and menstruation regular, dilatation of the uterine cavity by blood (hæmatometra) (Fig. 75) or by pus (pyometra) may result (*vide* also Fig. 55).

The effect which a conical cervix and stenosed os uteri externum has upon menstruation and fertility is still a debated one: the dysmenorrhœa is certainly not due to the obstruction, but to the

spasmodic contraction of the immature uterus, with which it is nearly always associated: a stenosis is rare which will not allow the 30-40 drops per hour of menstrual blood to pass easily and painlessly. A contracted os uteri may produce a certain difficulty in fertilisation, and the patient's condition is one of *relative* sterility; absolute sterility is not due to this condition, but is more likely to depend upon the rigid state of the tissues, which may impede spontaneous dilatation during coition.

(β) **Hypertrophic Elongation of the Cervix.**—This is a congenital defect, and it consists of a more or less exaggerated lengthening of the vaginal portion of the cervix, without any thickening of the walls or other abnormal pathological condition arising. The os uteri may present at the vulval orifice or may even be extruded, simulating a prolapse of the uterus; the os uteri in this condition is often found smaller than normal (Fig. 76).

The diagnosis is easy; it will be found that the anterior and posterior fornices retain their normal depth. The sound will pass four or more inches, but the point of it at the fundus uteri will be felt just above the symphysis pubis; by combined rectal and bladder examination the uterine body will be felt.

The symptoms to which it gives rise are difficulty in the act of coitus, and the presence of the cervix in the vulval outlet.

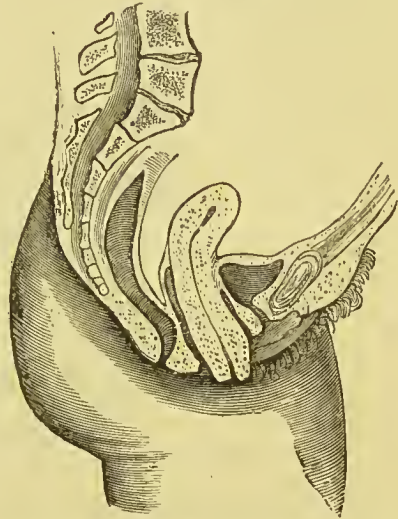
Treatment.—Removal by the écraseur, and amputation by the circular or by the flap method.

The dangers are:

- (1) A possibly deep Douglas's pouch and opening of the peritoneal cavity;
- (2) Severe hæmorrhage;
- (3) Secondary stenosis of the cervical canal by cicatrisation

(γ) **Laceration of the Cervix Uteri.**—This consists in a breach of continuity of the cervical canal; it occurs during labour in about 32 per cent. of parous women, and is caused usually through too rapid a labour, or the extraction of the child with forceps

FIG. 76.



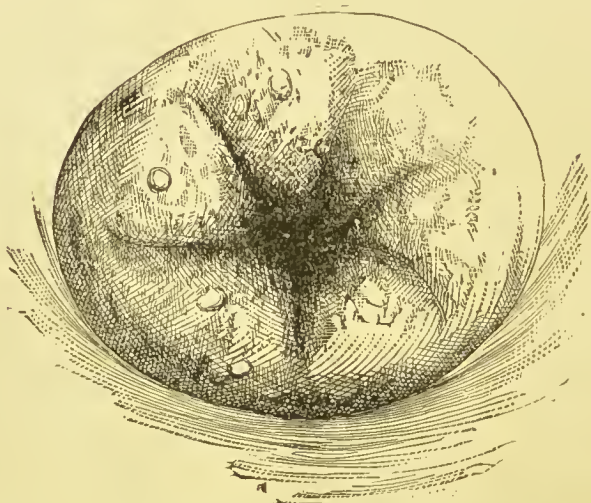
Hypertrophic elongation of the cervix uteri simulating prolapsus uteri (Fig. 66).

The anterior and posterior cul-de-sacs are seen to be normally situated. (After Schroeder.)

before complete dilatation and thinning out of the cervix has taken place; tearing begins at the rim of the external os uteri, and may extend up to the roof of the vagina, thus involving the whole thickness of the cervical wall, or it may be superficial only; occasionally the vaginal mucous membrane is involved, when a hard cicatrix often results. In dilatation of the cervix by bougies laceration commences at the internal os uteri and extends downwards.

The most usual site of a laceration is to the left and anterior; then, to the right and posterior, and therefore diametrically opposite; should these two occur together, a "bilateral laceration" is produced; if several lacerations occur, they are generally superficial, and arranged in a radiating manner; these produce a "stellate laceration" of the cervix (Fig. 77).

FIG. 77.



Stellate laceration of the cervix (superficial). (After Emmet.)

A few Nabothian follicles are scattered over the surface.

Deep laceration is attended by certain results; the cervical lips tend to spring apart like celery when peeled, and the mucous membrane of the cervical canal becomes everted in consequence.

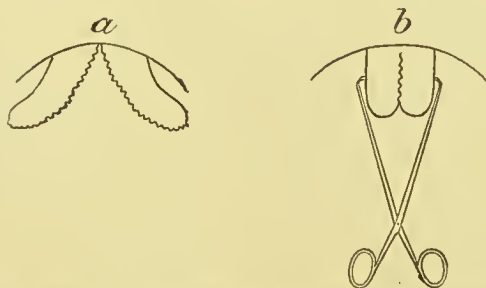
To see a bilateral laceration a Sims's speculum must be used; by applying a volsella to the vaginal surfaces of the two flaps and bringing them together a normal cervix is temporarily produced (Fig. 78).

The Symptoms vary very much; a severe laceration may exist and produce absolutely no symptoms; but a painful vaginal cicatrix may result, and there may have been a cellulitic deposit in its neigh-

bourhood which adds to the cicatricial contraction. Menstruation is often profuse and various reflex symptoms have been imputed to the existence of a deep laceration; leucorrhœa from the inflamed and extroverted cervical mucous membrane is often profuse.

Treatment.—The minor degrees of laceration require no local treatment, but the deeper ones, if producing hæmorrhage and general constitutional disturbance, are cured by ignipuncture with Paquelin's cautery, or by paring the edges of the laceration and bringing them together by means of wire sutures; if union results, the cervix appears virgin-like. This operation, which has been performed much too frequently and unnecessarily, is called *trachelorrhaphy*; it is not without danger, both immediate and remote, and moreover is not easy to perform. It should not be

FIG. 78.



Deep bilateral laceration of the Cervix (side view).

a. As seen with a Sims's speculum.

b. The same cervix with the flaps adapted by a volsella.

resorted to without clear indications that the laceration is the origin of the trouble under consideration.

III. Inflammations of the Uterus.

These may be enumerated as follows:—

- a.* Cervical endometritis—that is, inflammation of the mucous membrane lining the cervical canal (endocervicitis).
- β.* Corporeal endometritis, where the endometrium or mucous membrane lining the body of the uterus is affected.
- γ.* Metritis, or inflammation of the muscular wall of the body—that is, the tissue between the endometrium and the peritoneal covering; diagnosis of this condition is difficult; it usually follows on traumatism from operation or sepsis after labour or abortion.

δ. Perimetritis, or pelvic peritonitis, where the peritoneal covering of the uterus is involved. This will be considered under Chapter xv.

α. Acute inflammation of the cervical lining membrane is usually a complication of corporeal endometritis, and will be treated of under that disease. The *chronic* form is the one usually met with, and consists of a chronic inflammation of the mucous membrane of the cervical canal.

Chronic cervical endometritis is more commonly found in the parous than in the nulliparous woman; a bilateral laceration in the former often giving rise to it, as has already been noticed: in such cases there is much hypertrophy and thickening of the cervical lips; in the form found in nulliparous women, the mucous membrane only is inflamed, the other tissues are healthy.

The exciting causes may be:

- (1) Traumatic, such as labour, or the use of dilating bougies, or tents;
- (2) Extension from the corporeal endometrium downwards;
- (3) Extension from the vaginal mucous membrane upwards;
- (4) The presence of a foreign growth like a polypus in the cervical canal;
- (5) A chill, especially immediately before or during the catamenial period.

The **Symptoms** vary, and may be limited to the presence of leucorrhœa, which attracts the patient's notice by staining her linen and making her sore about the vulva; sacralgia, irregularity of menstruation and dysmenorrhœa, may be present; if married, sterility will not be unlikely, although not necessarily so.

Physical Signs.—On examination per vaginam, the cervix to the touch may be normal, or perhaps bulky. Should lacerations exist, they will be made out. The cervix may be painful to the touch, smooth and velvety, or "shotty." When examined by a Sims's speculum, the first condition to attract attention is the discharge, which is seen issuing from the os uteri and may be present in the vagina. Healthy discharge from the cervical glands is clear and glutinous, like the unboiled white of egg, but becomes opaque and white on reaching the vagina. In inflammation of the cervical endometrium, the discharge loses its clearness and becomes opalescent, and the colour may vary from white to deep yellow, or even be blood-stained, according to the intensity of the inflammatory process. The discharge should be wiped away with cotton-wool on long forceps; owing to its viscosity this is not easy, and a plug of mucus usually remains behind in the cervical canal. In the nulliparous woman, a deep-red circle of greater or less

width will be seen surrounding the os uteri externum, which has a granular ulcerated look, and is distinct from the pink colour of the surrounding cervix. In a multipara the red surface is more extensive, extending over the flaps of the lacerated portions, which are everted (Fig. 79, I.); if two tenacula are applied to the outer surface of the flaps and then approximated, the red surface will be hidden by their adaptation (*vide* Fig. 78). In some cases the diseased surface is dotted over with yellow sago-grain-like bodies, which give the "shotty" sensation mentioned above; these are dilated and obstructed cervical glands, and are called the ovula Nabothi.

If this raw-looking surface be examined more closely, it will be found to be raised slightly above the surrounding surface, and

FIG. 79.



Diagram of a bilateral laceration of the cervix, with extroversion or erosion of the lining membrane. Seen by means of Sims's speculum. (The unshaded portion is healthy.)

Vertical section through the anterior everted portion (a).

1. Villi covered with a single layer of cubical epithelium.
2. Epithelium of vaginal portion of cervix.
3. Vessels to and from villi.

(From a multipara.)

formed of a tissue somewhat similar in structure to that of the mucous membrane lining the cervix, and covered by a single layer of columnar epithelium (Fig. 79, II.). It secretes the unhealthy discharge which is a sign of the disease. This surface was formerly looked upon as truly "ulcerated" from its abraded look, and treated accordingly, under the name of "ulceration of the cervix." "Extroversion" of the mucous membrane is a better term.

Three varieties of extroversion are described: the *simple* or granular form; the *papillary*, in which the thin epithelial layer covers enlarged papillæ, producing a villous appearance of the surface; and lastly, the *follicular* form, where the ovules of Naboth or retention cysts are formed.

Treatment.—It must be particularly remembered that all these three forms may give rise to no symptoms whatever beyond

leucorrhœal discharge, and may therefore require no treatment. Usually the patient is depressed in health, and the constitutional state must therefore be paid special attention to; a tonic of quinine and iron or arsenic and iron, with regular purgation, is in many cases sufficient to effect a cure.

Where local treatment is necessary, it should be directed as follows:—

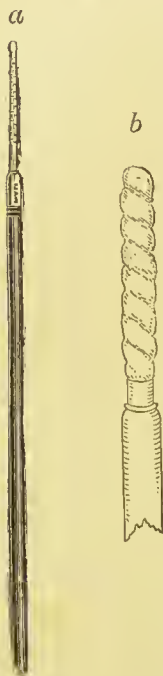
Hot douches night and morning (as described in Chapter vii.), with decoctum papaveris ʒij to each quart of water, to produce an anodyne effect; later, in order to give the water an astringent property, zinci sulphatis, ʒij to the quart, or a similar amount of copper sulphate. This treatment should be persisted in for a month or six weeks: if no good result occurs, then it is right that some topical application should be made.

For this means there are two distinct methods. (1) The first, and the one in general use, is to expose the cervix with Sims's or Fergusson's speculum; then take a Playfair's probe (Fig. 80, *a*), wrap cotton-wool round its metal end, in a thin layer (Fig. 80, *b*); after having wiped away the discharge with cotton-wool by means of the forceps, dip the probe into a saturated solution of carbolic acid in glycerine and apply it freely and firmly to the red surface and interior of the cervical canal, rubbing it up and down; to prevent any escape of the fluid into the vagina when using a Sims's speculum, the lower vaginal fornix may be plugged with cotton-wool: the superfluous solution must be wiped off to prevent any injury to the mucous membrane of the vagina; the carbolic is anæsthetic and the glycerine just keeps it viscid.

Tinctura iodi, or a mixture of iodine and carbolic acid, is used in a similar manner.

(2) A more thorough method is to expose the cervix through a Fergusson's speculum: sufficient solution of sulphate of copper in water (ʒss ad ʒj) is then poured into it, to well cover the vaginal portion of the cervix: the wool-covered Playfair's probe is then pushed into the cervical canal as far as the internal os uteri, being moved up and down several times; fresh portions of the solution are thus brought to act upon the

FIG. 80.



a. Playfair's probe.
(*a*) Covered with cotton-wool, and ready for use.

(From a photograph.)

diseased mucous membrane; as the solution coagulates the mucus, it allows of its easy removal, and the direct action of the drug upon the diseased surface. A glycerine pledget should be passed immediately afterwards in both methods to protect the vaginal mucous membrane.

In the event of this failing to effect a cure, the Paquelin's cautery should be applied to the cervix: the point should be buried in the cervical tissue for a quarter of an inch in five or six places so as to produce a seton effect ("ignipuncture").

In very obstinate cases, the author has found the process of "erasion" of the cervical glands by means of the sharp curette the only remedy of any avail. It consists in scraping away the whole diseased mucous membrane of the cervical canal, in the hope that that reproduced may be more normal.

By some, excision of the mucous membrane is recommended, and adaptation of the flaps so produced to each other. As before mentioned, in multiparæ where there is extreme laceration with menorrhagia and general reflex symptoms present, the operation of trachelorrhaphy should be taken into consideration, and performed if necessary.

If all the above modes fail, further treatment is not advisable.

β. Corporeal Endometritis, or inflammation of the mucous membrane of the uterine body, is extremely rare as an acute affection, and only occurs in the course of acute septic disorders after labour, abortion, or operation, and is an occasional complication of the exanthemata, particularly of scarlet fever.

Chronic corporeal endometritis, on the other hand, is extremely common, and although it may be a sequel of the acute form, it can be considered as a separate disease.

Causation.—Repeated parturition, prolonged lactation, neurasthenia, and in fact any conditions tending to depress the constitution, may be considered as predisposing causes.

The chief exciting causes are—

1. Labour and incomplete or neglected abortion, especially if sepsis has supervened;
2. Traumatism, for instance, intra-uterine applications, tents, intra-uterine stem-pessaries, removal of polypi, and operations on the uterine interior generally;
3. Exposure to cold, or sexual intercourse during menstruation, with temporary cessation of the flow;
4. Extension from below upwards of inflammation from the cervix, or more commonly from the vagina, as in gonorrhœa, producing the condition known as gonorrhœal endometritis;

5. The presence of new growths in the uterine cavity ;
6. The menopause, producing the so-called senile endometritis.

Pathology.—There appear to be at least two distinct types of endometritis: one in which the main feature is a glandular hypertrophy, where the glands project as polypoid protrusions, and are productive of a profuse leucorrhœal discharge, and the other in which there is dilatation of the blood-vessels; in this latter variety the mucous membrane is much thickened, and scattered over its surface are villous projections which can be felt by the finger after dilatation of the cervix and which bleed freely; the glandular element is little changed; the chief characteristic of this form will be found to be hæmorrhage and not leucorrhœa: this condition constitutes “fungous endometritis.”

Symptoms.—There are usually one or more of the following present:—

1. Leucorrhœa ;
2. Menorrhagia and metrorrhagia ;
3. Sacralgia and groin-ache.

Added to these are sympathetic disturbances of the digestive and nervous systems, often with loss of flesh. There is usually a tendency to abortion. A pronounced neurasthenic condition is frequently the ultimate termination of such cases.

Leucorrhœa is very common ; as it is usually combined with the cervical discharge, its distinctive characters are not certain; in consistence it is less viscid than the cervical leucorrhœa ; a brownish colour is present when metrorrhagia occurs.

Menorrhagia is also frequent, and is further complicated by metrorrhagia ; these are leading features of the second pathological variety: the loss may be in excess of the ordinary flow, or amount to periodic flooding, in which case constitutional symptoms like anæmia and debility soon make their appearance: dysmenorrhœa may be present, and in certain cases membranous casts of the interior of the uterus are passed.

The *sacralgia* is a wearing pain rather than a severe one ; it can be localised over the base of the sacrum, and may be relieved by pressure ; it is increased by over-exertion, and is better after rest. The *pain in the groins* is of a dragging character, and is influenced much in the same way as the sacralgia, by rest and exertion.

Diagnosis.—This can only be made by a consideration of the previous history of the patient, her prominent symptoms, and the physical signs present: these last are—(1) An enlarged uterus, which can be made out bimanually. (2) By the speculum, the leucorrhœal discharge in more or less quantity may be seen

issuing from the os uteri; whether cervical or corporeal, or both, is difficult to determine. (3) If pregnancy can *certainly* be excluded, the passage of the sound indicates increased length (above $2\frac{1}{2}$ inches) and a dilatation of the uterine cavity; tenderness of the endometrium, especially at the fundus, is present, and withdrawal of the sound is followed by a varying quantity of hæmorrhage; in some cases also the bulbous extremity produces a grating sound when passed over the rugosities of the diseased endometrium.

If cervical endometritis be present, the softened sensation associated with pregnancy may be simulated.

Should a patient then with a history of recent labour or repeated miscarriage come complaining of backache, discharge and menorrhagia, and if on examination the physical signs above were found, it would be very probable that endometritis existed, but not certainly so. Two important conditions must be distinguished from it: they are early sarcoma and carcinoma of the endometrium.

Where there is a doubt, the interior of the uterus should be scraped with a sharp curette, either with or without previous dilatation of the cervix by means of Hegar's bougies; the scrapings will under the microscope give considerable, but not absolutely certain, information. Sarcoma, especially the round-celled form, is particularly liable to be mistaken for endometritis, where the infiltrating small cells of the latter must be carefully distinguished from the larger ones of sarcoma. Total extirpation of the uterus has been performed under the mistaken idea that malignant disease existed.

Treatment.—Palliative means should always be tried, in the shape of hot astringent douches, rest, and iron tonics, combined with saline purgatives; these should be persevered with for at least two months: if the discharge is profuse, the interior of the uterine cavity should be swabbed out with a saturated solution of carbolic acid in glycerine,* lin. iodi, or similar solution (p. 136): this is performed as a rule without previous dilatation, as there is a patulous condition of the internal os uteri. The cervix is exposed with a Sims's or a Fergusson's speculum. If the former instrument is used the anterior lip is fixed with a tenaculum; two Playfair's probes are then taken and covered with a thin, teased out film of cotton-wool, and by successive layers made of the required thickness (Fig. 80); the covered probe, dry, is passed into the cervix, and if the uterus is normally situated, the handle is brought backwards as its point is

* Just sufficient glycerine at boiling point is used to dissolve the crystals of carbolic acid.

pushed into the uterine cavity; this wipes away any mucous material from the endometrial surface. On withdrawal, the other probe is dipped into the solution selected, passed immediately, and rubbed up and down, so as to be thoroughly applied to the diseased surfaces: after removing it, one or more glycerine pledgets should be inserted. This should be performed three clear days after the cessation of the period, and repeated every week up to seven days before the onset of the next menstruation.

In the event of this treatment failing, and especially in the hæmorrhagic cases, dilatation of the cervix and thorough scraping of the endometrium with a sharp flushing curette, should be resorted to; after dilatation, if the little finger be inserted into the interior of the uterus, the granulations can be distinctly felt. The passage of a negative current of electricity has in certain obstinate cases been followed by complete cure.

Intra-uterine injections of medicated solutions, except with a fully dilated os uteri or a double-channelled catheter (Fig. 45, p. 83), are inadvisable.

If pregnancy takes place, abortion is very likely to happen, and hence every precaution against this mishap should be insisted on; pregnancy and parturition tend to cure the ailment.

IV. Subinvolution and Super-involution of the Uterus.

(i.) Subinvolution.

During pregnancy the uterine walls become thicker and heavier; this is due to a proliferation of the plain muscular fibre cells, the individual cells themselves also increasing in size; immediately labour terminates, an opposite process commences. The weight of the uterus post-partum is from 22 to 24 ounces: this becomes reduced to from 10 to 11 ounces by the end of the second week, and at the end of six to eight weeks immediately following labour the uterus should weigh about $1\frac{1}{2}$ ounce. This is the normal sequence of events, and is called *involution*. Should this not be completely effected, and the uterus remain larger and more bulky than normal, then we get varying conditions of *subinvolution*: it must be borne in mind, however, that the parous uterus never quite regains its nulliparous size or weight.

The process of involution is carried on by means of a fatty degeneration of the hypertrophied muscular fibres, and the subsequent removal of the degenerated products; if these products are only imperfectly got rid of, and connective tissue is formed as a substitute, the uterus will remain permanently hypertrophied.

Causation.—1. The most common cause and the one most frequently met with among the poorer classes is assuming

the erect posture too soon after labour or miscarriage; many women think nothing of a miscarriage, and walk about with it going on or immediately after the expulsion of the decidua. Premature assumption of the erect posture produces a venous or passive congestion; the uterus being large and the over-stretched tissues still relaxed, there is a tendency to descend by its own weight; this puts all the tissues supporting it, especially the utero-sacral and broad ligaments, on the stretch, and so an obstacle is presented to the return of the venous blood.

2. Retention of the placenta or products of conception after a miscarriage or abortion.

3. The presence of fibroids in the uterine wall.

4. Non-suckling or over-suckling of the infant.

5. Any cause interfering with the return of the venous blood from the pelvic organs, such as adhesions from old-standing or recent pelvic peritonitis or cellulitis: a tendency to venous stasis as in (1) is thus produced.

Symptoms and Physical Signs.—These are usually bearing-down pain, sacralgia, and, if there is corporeal endometritis, profuse leucorrhœa; or the lochia may never have ceased since the abortion or labour. Irregular hæmorrhages are extremely common.

Examination *per vaginam*, shows a uniformly enlarged uterus, which therefore retains its pyriform shape; it may be retroverted and low down in the pelvis. This enlargement is well made out bimanually; the cavity of the uterus may be as long as 4 to 5 inches and dilated, while the fundus uteri is felt above the brim of the pelvis; should the sound pass only slightly above normal and still bimanual examination show enlargement, this is a clear indication that the walls are implicated and subinvolution present.

Care must be taken to exclude the existence of *early* pregnancy in this disease. The shape of the uterus is the only guide after the history has been gone into; in pregnancy, there is usually anteversion in the early months with a globular shape of the body due to an increase in the antero-posterior diameter, and the uterus is softened and semi-elastic to the touch: in subinvolution the uterus is often retroverted and retains its flattened anterior surface, while to the touch it is harder and more resistant than in pregnancy (*vide* Appendix).

The softening of the cervix occurs in both, and is therefore unimportant; the value of the violet discoloration of the vagina and cervix is open to doubt.⁹

Treatment.—Anything tending to depreciate the general nutrition is to be avoided, therefore too much rest should not be indulged in, but be limited to two or three hours in the day,

preferably in the afternoon; open air exercise with as little fatigue as possible is essential.

The chief pathological condition to treat is the venous or passive congestion; as the uterus is often slightly prolapsed and retroverted, a rubber ring pessary will be sufficient to raise it up and relieve the stretching and dragging of the various uterine ligaments (Fig. 68). Hot vaginal douches (temp. 110° – 120° F.) twice daily should be given, and if the patient can bear it, a cold bath in the morning followed by vigorous towelling.

Ergot in the form of the liquid extract in ζ ss doses twice daily and combined with *hydrastis canadensis*, prescribed thus:

R	Extr. Ergot. liq.	.	.	.	.	.	.	ζ ss
	Extr. Hydrast. Can.	.	.	.	.	.	.	ζ ss
	Aquam	.	.	.	.	.	.	ζ ss

A tablespoonful thrice daily.

or ergotine pills (gr. ij) should be given three times daily; iodide of potash in gr. v doses is sometimes of value, possibly from its absorptive power; the bowels should be well opened by a saline purgative such as Hunyadi Janos, sulphate of magnesia, or decoction of aloes (ζ j). These are cases in which the "bath" treatment is often of so much avail, and if the patient's means allow of it, a visit to Kreuznach, Schwalbach or Ems in Germany, or the Woodhall Spa in England, is always accompanied by great and often permanent benefit.

In cases where the passive congestion is more due to the adhesions of para- and perimetritis, treatment should rather be directed to these conditions (*vide* p. 187).

If in spite of the above courses of treatment the symptoms, especially hæmorrhage or the presence of offensive discharge, go on and the patient's general health is suffering, an examination of the interior of the uterus is necessary: dilatation of the cervix should be performed by means of Hegar's dilators, and any placental remains or polypi removed; should any endometritis be present, deep scraping with a sharp flushing curette should be performed (*vide* p. 90). These operations must, it is needless to say, be done only with the strictest attention to antiseptic details.

(ii.) Super-involution of the Uterus.

This is a rare condition brought about by excessive involution after delivery, hence the name "post-partum atrophy" sometimes given to it. The uterus is reduced in size beyond the normal, so that it may measure externally as little as 2 inches, while the

cavity may be reduced to $1\frac{1}{2}$ inch. Entire atrophy of the uterus and ovaries is said to occur.

Causation is obscure. Hyper-lactation, so frequently practised among the doorer classes to prevent conception, is thought to be a cause, but as the frequency of this pathological condition is about one per cent. only, it cannot be the only one. No treatment is of any avail, and the amenorrhœa which is the chief symptom does not induce patients to seek relief.

Leucorrhœa.

A leucorrhœal discharge is a normal secretion altered or in excess (p. 53). It is impossible, however, to state the *quantity* which makes a pathological condition.

(1) In *children* the chief cause of discharge is vulvitis (p. 97).
 (2) In *virgins* a leucorrhœa is often present and due to anæmia or struma, consisting, at first, of clear mucus, and as the catarrh goes on becoming purulent. It is not certain whether the discharge is endometrial simply or not, as examinations are not resorted to under these conditions. Cancer, fibro-myomata and polypi may give rise to leucorrhœa and offensive discharges, but there is in addition hæmorrhage. In later virgin life, the condition called fungous endometritis, (adenoma fundus uteri) sometimes occurs giving rise to an acrid and irritating uterine discharge. (3) In *married women* leucorrhœa is very common and its chief cause is undoubtedly child-bearing. The vagina is frequently at fault, although the uterus and cervix may have a slight share. (4) In *old women* leucorrhœa must always be looked upon as pathological and often the result of grave disease.

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CHAPTER XII.

AFFECTIONS OF THE UTERUS—(*continued*).

V. Uterine Displacements.

THE usual position of the uterus in the pelvic cavity has already been described in Chapter i. (p. 22). The uterus itself is normally quite mobile, and owing to the firm and elastic nature of the tissues composing it should maintain its shape in spite of outside influences. But from congenital and acquired causes, this organ may become subject to alterations in its situation as regards the surrounding viscera and in the relation of the cervix and body to one another; it is customary to divide these alterations, or "displacements," as they are called, into three divisions.

1. If the uterus be rotated around an imaginary transverse axis, so that its long diameter no more remains about at right angles to the plane of the pelvic inlet, and if the relative angle of the body to the cervix be unaltered, we get what is called a "version"; it is a *dislocation*.

Rotation forwards will then be a condition of *anteversion*, and backwards *retroversion*.

2. If the long axis of the body and that of the cervix do not bear their normal relation to each other—*i.e.*, if the angle made by them is less obtuse than from 165° to 130° , we have a flexion and in an anterior direction: should the body become bent on the cervix in a backward direction, we have a posterior flexion. It may be described as a *deformity*; we may have, therefore:
 - Anteflexion, or excessive anterior bending;
 - Retroflexion, or posterior bending;
 - Lateri-flexion, or lateral bending to the right or the left.

Flexion usually takes place at a point on a level with the internal os uteri, or slightly above it; the body is never flexed on itself.

3. Should the uterus be displaced as a whole, without disturbing its normal physiological anteversion and anteversion, a change in "ponation," "position," or "pose" is produced; we may have therefore a pushing forwards, or anteponation; backwards, or retroponation; or to either side, lateri-ponation.

A uterus may be displaced downwards, as in prolapsus uteri (Chap. x.), or pushed upwards, as in pregnancy or fibroid tumour, or to the sides of the pelvis by a cellulitic or hæmorrhagic effusion.

The uterus in its normal situation may be accurately spoken of as in a state of slight anteversion, anteversion, and anteponation.

(a) **Anterior Displacements.**—These may be:

Anteversion;

Anteversion;

Anteponation.

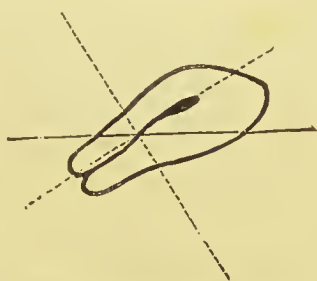
Diagnosis.—On examining a patient with normal pelvic viscera, on her left side and with the bladder not distended (by the bimanual method), the anterior cul-de-sac is found to be occupied by a globular mobile swelling: this can be palpated between the left hand above the symphysis pubis and the examining finger or fingers in the vagina (p. 41). The cervix will be found pointing backwards and the os uteri looking into the hollow of the sacrum (Fig. 81). This swelling is the fundus of the uterus, and a sound passed as shown in Fig. 34, p. 46, will verify the diagnosis. This is anteversion: per rectum the cervix will be felt bulging backwards into that viscus (p. 51).

By passing the examining finger along the anterior wall of the cervix and body, a more or less marked transverse sulcus will be felt, according to the acuteness of the angle of union between the longitudinal axes of the body and the cervix. In the normal state this is an extremely obtuse one; but should it be less than 130° , or at least 120° , we get an abnormal condition of anteversion in addition to normal anteversion; the cervix may be normally situated (Fig. 81), or be flexed and look forward (Fig. 82: 2).

If the uterus as a whole be placed close to the symphysis pubis, thus producing a very ill-defined anterior cul-de-sac and a correspondingly pronounced posterior cul-de-sac, the condition of "anteponation" results.

When no swelling can be felt in the anterior cul-de-sac. and

FIG. 81.



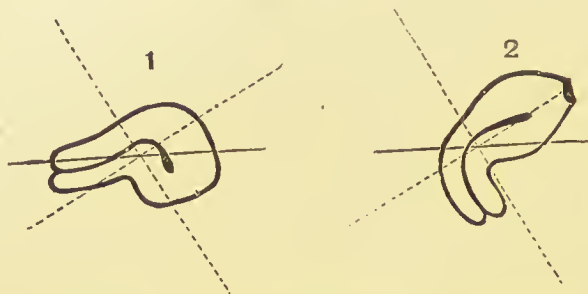
The normal position of the uterus.

The dotted lines are parallel to the plane and the axis of the pelvic inlet.

the examination has been made with all proper precautions (Chap. ii.), we may conclude that the normal anterior position of the fundus is not present.

(β) **Posterior Displacements.**—If on examining a woman in

FIG. 82.

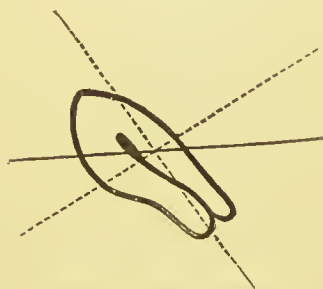


Abnormal anterior displacements of the uterus.

1. Cervix normal, fundus flexed.
2. Cervix flexed forwards, fundus normal.

the same position and with an undistended bladder bimanually, we find the anterior cul-de-sac empty, but the posterior occupied by a swelling, which is mobile, globular, and continuous with the cervix, and moving with it; if in addition the cervix

FIG. 83.



Posterior displacement of the Uterus.

(The dotted lines as in Fig. 81.) Retroversion. cf. Fig. 81, normal position.

points forwards towards the symphysis pubis, and the os uteri looks towards the anterior vaginal wall, this is *retroversion* (Fig. 83). Examination per rectum will show that there is an absence of the cervix; but higher up a large globular body (the fundus) will be made out. Passage of the sound will be conclusive; it passes with its concavity backwards, and evidently enters the globular swelling, and by rotating it in a forward direction *ante-flexion* can be produced. If there be a distinct sulcus between the cervix and fundus it is probably a *retro-flexion*, and the cervix may point directly forwards or backwards

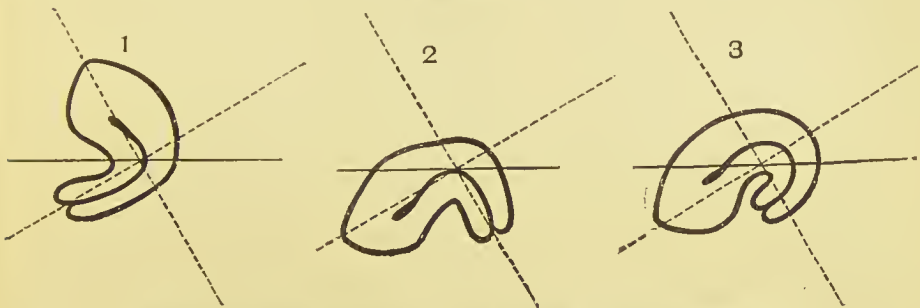
(Fig. 84). Should the uterus *en masse* be pushed back towards the sacrum, so that the anterior cul-de-sac is as much developed as the posterior is correspondingly diminished, we have a *retro-position*.

(γ) **Lateral Displacements.**—In these, *lateri-flexion* only is of

importance; in this condition the right or left fornix is occupied by the fundus uteri.

In the above we have considered the cervix as either remaining in its normal position (as in anteversion or flexion), or lying in an opposite direction to the fundus, the relation of these to each other being unchanged, as in retroversion. But it must be remembered that we can have additional varieties. For instance, take Fig. 82 : 2, of ante flexion. We have acute flexion of the cervix on a normally situated fundus—*i.e.*, with the os uteri looking forward and the cervix pointing in a similar direction. Again, with retroflexion, the cervix may look backwards and be flexed on a slightly retroverted fundus (Fig. 84 : 1): a further advance still would be a combination of marked retroversion with retroflexion (Fig. 84 : 3).

FIG. 84.



Posterior displacements of the uterus (varying grades of retroflexion.)

1. Slight retroversion of fundus, retroflexion of fundus on cervix.
2. Marked retroversion of fundus, cervix looking forward.
3. Marked retroversion and retroflexion.

Causation.—In *anteversion* the uterus will usually be found enlarged; it may be present in some forms of subinvolution and the early months of pregnancy. The slight physiological ante flexion has become effaced and the uterine canal is nearly straight.

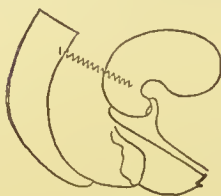
Anteflexion.—This is an exaggeration of the normal state: it may be—

1. A *congenital* condition, in which the uterus is ill-developed, the cervix being normal, but the body has not attained its full growth.
2. *Acquired*. This is nearly always due to recent or remote pelvic inflammation, in the shape of peritonitis or cellulitis: if the cellular tissue in the anterior cul-de-sac has been affected (anterior para-

metritis) the body and cervix may be drawn towards each other by the resulting cicatrisation: while in cellulitic deposit in the utero-sacral ligaments, the subsequent contraction will tend to pull upwards and backwards on the site of their uterine attachment, which is situated opposite the internal os uteri; acute flexion must then result (Fig. 85).

Retroversion and Retroflexion may be considered together; they rarely occur alone, and there is usually a condition of retroversion with retroflexion present; this will be spoken of as retroflexion.

FIG. 85.



Acute ante-*flexion* (acquired) resulting from contraction of the utero-sacral ligaments subsequent to inflammatory deposit.

1. It may be congenital, in which case the uterine body is ill-developed.
2. It always occurs in the first stage of prolapsus uteri.
3. In the first few days of the lying-in period, probably from the dorsal decubitus being resorted to, and the laxity of the recently stretched uterine ligaments, it is usually present.
4. Should old or recent pelvic adhesions exist posteriorly, the fundus may be *fixed* by them to the rectum and sacrum in a retroflexed position.

Symptoms.—If the uterus remains quite mobile, it is only rarely that

symptoms can be directly traced to versions or flexions, but they are found “associated” with many which are in reality due to other pathological conditions grafted on to the displacement. Exceptions are, however, (1) when the uterus is fixed by pelvic adhesions either in a state of ante- or retroflexion; irritation of the bladder and trouble with defecation may result; (2) when the uterus is increased in size, there is always a tendency, especially after abortion or labour, to prolapse of the body. (3) In the condition called “incarceration” of the retroflexed fundus between the folds of Douglas, the body is enlarged and congested and slips through the utero-sacral ligaments which, having muscular tissue within their substance, nip it and retain it there, producing a condition of semi-fixation.

Symptoms often found *associated* with flexions and versions are:

Sacralgia,
Leucorrhœa,
Dysmenorrhœa,
Menorrhagia,
Sterility.

Repeated miscarriages are not uncommon.

The *sacralgia* is due to the dragging of an enlarged uterus on the stretched ligaments or to remains of pelvic peritonitis affecting their action: the *leucorrhœa* is the result of chronic inflammation of the endometrium from passive congestion of the uterine tissue. Dysmenorrhœa and menorrhagia have already been fully treated of in Chapters v. and vi. It might, however, be stated here that the mechanical theory of *dysmenorrhœa*, holds (a) that in flexion there is a distinct obstruction to the circulation in consequence of the "kinking" at the flexion-angle which produces congestion. This is disproved almost entirely by the anatomical arrangements of the uterine circulation (p. 25).

(b) That at the flexion-angle the calibre of the tube is actually narrowed, producing an obstruction to the flow of menstrual fluid. But if this is true of a bent elastic tube with thin walls, it is not so of the uterus, which is an elastic organ with very thick walls: it may be sharply bent, but no diminution in its calibre takes place. There seems every reason to believe from more recent statistics that the association of dysmenorrhœa with flexions and versions is much less common than was formerly supposed. The dysmenorrhœa of retroflexion or ante flexion with a congenitally small uterus is due to the painful contractions of an immature uterus, and where this symptom is associated with pelvic adhesions, it is to them that the pain is due owing to their influence on the venous circulation.

There seems no doubt that flexions are associated with *relative*, not absolute, sterility—*i.e.*, a woman is less likely to conceive with an acute ante flexion than with a normally situated uterus. Repeated miscarriages are frequently associated with retroversion and retroflexion.

Treatment.—It must be borne in mind that a very large proportion of women with flexions and versions suffer no symptoms whatever, and that, when they do so, the pain is quite out of proportion to the magnitude of the displacement—*i.e.*, a woman with a marked version or flexion will for instance have a little leucorrhœa, while another with almost an imperceptible deviation from the normal will have every ache and pain possible.

Usually when a displacement gives trouble it is due either to the fixation already alluded to, or to a slight tendency to prolapse in addition; if a woman's symptoms are *not* relieved by the recumbent posture, it is in every probability certain that the displacement, however severe, has nothing to do with them *in itself*.

No treatment whatever can permanently cure a *flexion*; an intra-uterine stem will do so while it is there, but its application is accompanied by so many dangers that resort to it is undesirable.

The bulb of the instrument may ulcerate through the uterine wall, a large arterial trunk, or lead to sepsis.

Displacements can be relieved by pessaries or artificial supports, especially if there is an incarcerated fundus to deal with or a slight tendency to descent: always when examining a patient tell her to strain hard or bear down, the uterus always descends a certain amount.

Displacements requiring treatment—

- (1) Retroflexion with incarceration;
- (2) Retroflexion with slight prolapse;
- (3) Anteversion with slight prolapse of anterior vaginal wall.

For the two former, (1) and (2), the watch-spring ring pessary or Hodge's lever pessary is applicable: the former takes its support from the sides of the vaginal wall, it is pinched between the finger and thumb and inserted into the vulva; as it expands in the vagina it is pushed up to the roof and so placed that the cervix hangs through its centre; benefit is obtained by the relief to the stretched ligaments and the consequent passive congestion (Fig. 68). If the perineum is lacerated or the vagina more dilated below than above, a Hodge's pessary cannot be retained and we must resort to a ring pessary (Fig. 68)

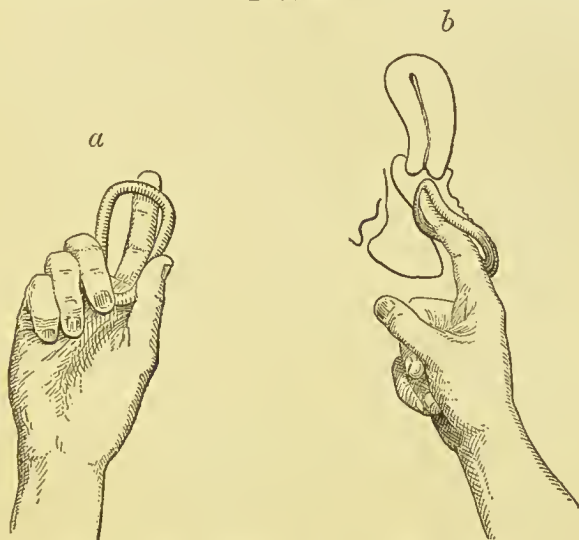
The shape of a Hodge's pessary is best indicated by the two Figs. (86, *a*, *b*): in section it has an S-shaped curve. It is composed of either malleable metal, celluloid, vulcanite, or watch-spring covered with india-rubber tubing: the two former can be moulded by the hand to fit the vagina, and several sizes should be ready in case of need.

How to Insert a Hodge's Pessary.—The woman should be in the left lateral position: replace the uterus by means of the sound, take the instrument, as depicted, in the right hand, hook the left forefinger over the perineum: then, remembering that the vulval slit is antero-posterior and that of the vagina transverse, commence by pushing the broader end into the vulva, avoiding the sensitive urethral region (Fig. 86, *a*); when the pessary is well past the vulval slit, rotate it on its long axis half a circle, press the forefinger against the upper bar and carry it backwards and upwards into the posterior cul-de-sac (Fig. 86, *b*); the pessary should thus lie with its superior concavity upwards and forwards, the inferior downwards and backwards, and is grasped by the vaginal walls and retained; the lower end of the instrument should be in apposition with the anterior vaginal wall. On straining, the patient will push the instrument down, but it will return to its place on cessation of the effort. She should walk about for ten minutes to ascertain if it is comfortable: if on examination it is still in its place, the patient must be told she is wearing an instrument shown how to

remove it, and warned to return in at least two months' time. An antiseptic douche, 1 in 60 carbolic acid, should be used every day by the patient.

A Hodge's pessary acts by putting tension backwards and

FIG. 86.



Mode of introduction of a Hodge's pessary.

- a.* Insertion into vaginal orifice. *b.* Passing the upper bar behind the cervix into the posterior cul-de-sac.

(From photographs).

upwards on the posterior fornix and so pulling the cervix in the same direction, the fundus therefore tending to fall forwards.

The accidents due to the presence of a Hodge's pessary may be intolerable pain from pressure on an old adhesion, a tender and prolapsed ovary, or an inflamed fundus uteri; if too tightly fixed—*i.e.*, if too large or ill-fitting—ulceration may take place, which if the pessary is not removed, may result in a fistula; ill-smelling and blood-stained discharge should always put the practitioner on his guard.

It is useless replacing the uterus by means of the sound, as it immediately returns to its displaced position on withdrawal.

(3) In rare cases of extreme anteversion and slight prolapse of an enlarged uterus and anterior vaginal wall a Galabin's pessary may be used (Fig. 87): it permits of coitus, and is therefore useful in married women.

FIG. 87.



Galabin's anteversion pessary.

Postural Treatment.—The genu-pectoral position is of considerable value in retroversion, if the uterus be quite mobile.

The Alexander-Adams Operation, which consists in shortening the round ligaments, has many advocates: at present sufficient evidence has not been forthcoming of the permanent good effects of this procedure.

Lateri-flexions are usually congenital, and require no treatment further than a ring pessary.

Ante- and Retro-positions are of interest from a scientific point of view, but never in themselves give rise to symptoms, and therefore do not require treatment.

Differential Diagnosis:

Anteflexion may be simulated by:—

- (1) Fibro-myoma of the anterior wall of a normally situated uterus (Fig. 88).
- (2) Pelvic cellulitis of the cellular tissue between the cervix and bladder, which is extremely rare—*anterior parametritis*.
- (3) A retroflexion with a fibro-myoma growing from the anterior uterine wall (Fig. 89).

(1) and (3) are easily recognised by the sound; in (2) the sound should not be passed; it is a pathological condition in which diagnosis is not easy.

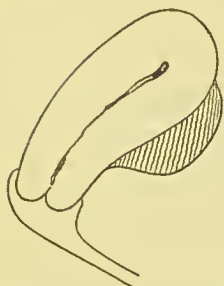
Retroflexion may be simulated by:—

- (1) Fibro-myoma in the posterior wall of a normally situated uterus (Fig. 90).
- (2) Fibro-myoma in the posterior wall of a retroverted uterus (Fig. 91).
- (3) Prolapsed ovarian cyst (adherent or free) or an enlarged and prolapsed ovary (Fig. 92).
- 4) Distended Fallopian tube, whether
 - (a) Pyo- or hydro-salpinx.
 - (β) Extra-uterine gestation.
- (5) The deposit of pelvic cellulitis (*parametritis*).
- (6) *Hæmatocele*.
- (7) *Fæces* in the rectum.

Lateri-flexion may be simulated by:—

- (1) Fibro-myoma (subserous) in the lateral uterine wall (*intra-ligamentous*).
- (2) *Intra-ligamentous* cyst.
- (3) Pelvic cellulitis of the base of the broad ligament.
- (4) Pelvic *hæmatocele*.

FIG. 88.



Fibro-myoma in anterior uterine wall. (From nature.)

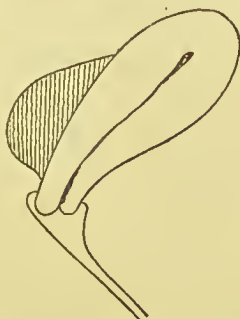
FIG. 89.



Retroflexion with fibro-myoma in anterior wall. (From nature.)

cf. Anteversion.

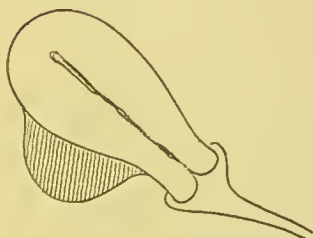
FIG. 90.



Normal uterus : fibro-myoma in posterior wall. (From nature.)

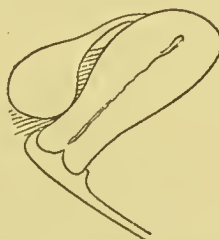
cf. Retroflexion.

FIG. 91.



Retroversion of uterus : fibro-myoma in posterior wall. (From nature.)

FIG. 92.



Prolapsed ovarian cyst (fixed) with normal uterus. (From nature.)

cf. Retroflexion.

Inversion of the Uterus.

In this condition the uterus is turned inside out, like the finger of a glove, the inverted fundus appearing in the vagina, and simulating a fibroid polypus; it is fortunately an extremely rare displacement, and may be met with either in an acute or chronic form.

Pathology.—The inversion most commonly ceases at the internal os uteri, so that the fundus and body of the uterus have really passed through the cervical canal (Fig. 93, *b*). The inverted portion may or may not be nipped at the external os uteri: it is covered by endometrium, which is therefore pressed upon by the vaginal walls, and may be subject to local gangrene and ulceration; hæmorrhage readily takes place from its surface; the cervix is not displaced unless there is inversion or prolapse of the vagina. Upon the peritoneal surface a cup-shaped depression is left at the site formerly occupied by the fundus; this is lined with peritoneal covering, and into it are at first dragged the Fallopian tubes and ovaries, and sometimes a loop of intestine: later, owing to retraction, the uterine ends of the Fallopian tubes only remain in that situation. The peritoneal surfaces are rarely united by adhesions, a fact of great importance when the question of reduction is considered. The bladder is not displaced unless there is prolapse of the vagina in addition, which is unusual.

Causation.—The prime factor in the production of inversion is a relaxation of the muscular tissue of the fundus, or a local want of tone; this is usually situated over the placental site (Fig. 93, *a*), or may be due to the presence of malignant disease; anything pressing on this portion from above, or making traction upon it from below, would tend to depress it. From above there is the intra-abdominal pressure, which is most marked during forcible bearing down, and squeezing the uterus in the dilated post-partum condition; while, as instances of the latter, we have incautious traction on the cord, or rarely a fibrous tumour in process of expulsion.

The muscular contractions of the remainder of the uterus, in conjunction with one or more of the above, cause the depressed portion to descend towards the internal os uteri, and later, through it into the vagina, which is the most usual form met with (Fig. 93, *b*), and lastly, but occasionally, inversion of the cervix and vagina takes place (Fig. 93, *c*).

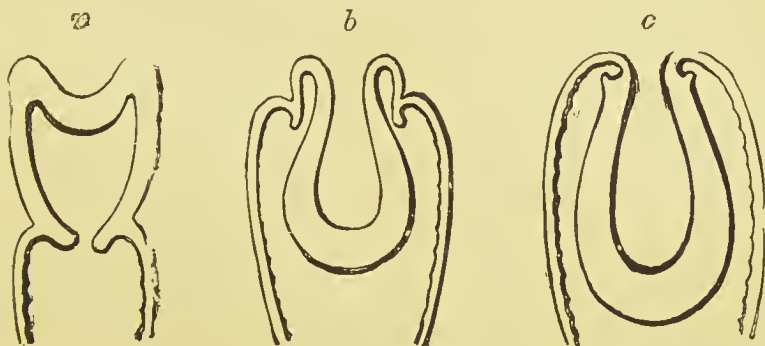
Inversion occurs as an acute displacement after labour: if this remains for any length of time unreduced we have the chronic form.

Symptoms.

1. Hæmorrhage, which is more or less profuse, and continued from the time of the accident, with consequent anæmia.
2. Those due to a mechanical obstacle in the vagina, such as the sensation of a foreign body in that situation; dyspareunia.
3. Dragging pains in the back and loins.
4. Bladder troubles, if there is a cystocele.

Diagnosis.—An acute inversion is scarcely likely to be mistaken for any other morbid condition, and concerns the obstetrician rather than the gynecologist.

FIG. 93.



Stages of production of complete inversion of the uterus.

- a. Partial or commencing inversion of the fundus.
- b. Chronic inversion (common form).
- c. Complete inversion with inversion of upper part of vagina.

A chronic inversion may be mistaken for a fibroid polypus (*i.e.*, a mucous fibroid having become pediculated) presenting at the os uteri externum.

In a chronic inversion we have :

1. Impossibility of passing the sound beyond the internal os uteri.
2. Absence of the uterine fundus bimanually, or by one finger in the rectum, and a sound in the bladder (vesico-rectal examination, p. 52): a cup-shaped depression may be made out per hypogastrium in a woman with thin abdominal walls.
3. The tumour is tender.
4. The uterine openings of the Fallopian tubes may be seen on the surface in some cases.

Treatment consists in :

1. Attempts at reposition ;
2. Amputation of the mass in the vagina.

1. **Reposition** is most likely to be successful if pressure be continuously used against the inverted fundus, and at the same time an attempt be made to dilate the contracted cervix.

An anæsthetic is absolutely necessary, and the patient may be in the dorsal or left lateral decubitus. The whole hand should be introduced into the vagina, and the tips of the fingers and thumb pressed up into the circular space at which the flexion of the body on the cervix has taken place ; the object of this is to dilate

the constricting external os uteri ; with the palm of the same hand upward pressure is made, counter-pressure from above downwards being made by the left hand over the abdomen. Reduction begins as a rule by a dimpling of the inverted fundus, which is followed by the rest of the body passing up through the cervix in inverse order to its method of descent.

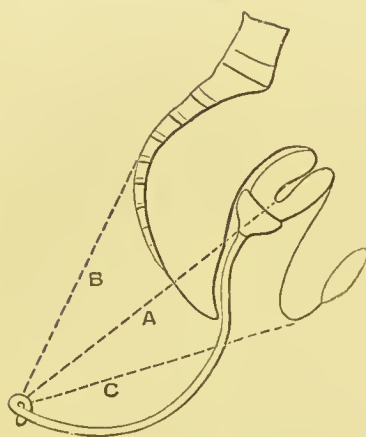
A much more satisfactory method of producing continuous pressure is by means of an Aveling's sigmoid reposer and elastic cords (Fig. 94). The figure shows it in position : the reposer consists of a vulcanite cup, into which is screwed a steel rod with an S-shaped curve and a loop at the distal end : the cup is made in various sizes, and should be smaller than the inverted fundus.

The instrument is represented in position. A. The line of pressure, the resultant of the two traction lines B, C.

It is inserted into the vagina and kept in its place by antiseptic packing. The elastic bands (B, C), four in number, are fastened to the loop, and attached, two in front and two behind, to an abdominal band ; constant and considerable pressure is thus directed *in the axis* of the pelvic inlet, which is of the highest importance ; all straight repositors fail in this particular.

The cup, as a rule, suddenly depresses the fundus after some hours' use, and passes into the uterine cavity. Pain is usual, and can be combated by regulated doses of morphia. The time occupied in effecting reduction has varied from nine to fifty-four

FIG. 94.



The sigmoid reposer
(Aveling's).

and a half hours, and has been successful after as long as five years' inversion.

2. In cases where failure in reposition has taken place and hæmorrhage is severe, amputation by the elastic ligature or electric cautery is advisable.

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CHAPTER XIII.

AFFECTIONS OF THE UTERUS—(*continued*).

VI. Uterine Fibromata.

A FIBRO-MYOMA may be described as a localised hypertrophy of uterine, with a varying amount of connective, tissue. As this latter is most commonly in excess the term “fibroid” has come into general use. It is, however, an incorrect one although convenient.

(i) **Ætiology.**—Much uncertainty exists as to the origin of these growths. Statistics, however, prove that the African races are peculiarly liable to them. They chiefly occur during the period of menstrual activity and usually between the ages of thirty and forty years. None have been known to arise before the onset of puberty, or after the appearance of the menopause. Married women are much more prone to develop the disease than single women.

(ii) **Structure.**—A fibro-myoma consists of plain muscular fibre and connective tissue. Should the former be in excess, which is rare, we have a true myoma; if the fibrous tissue predominates, which is the rule, we have a fibro-myoma. There appear to be two varieties—(a) the hard, (b) the soft.

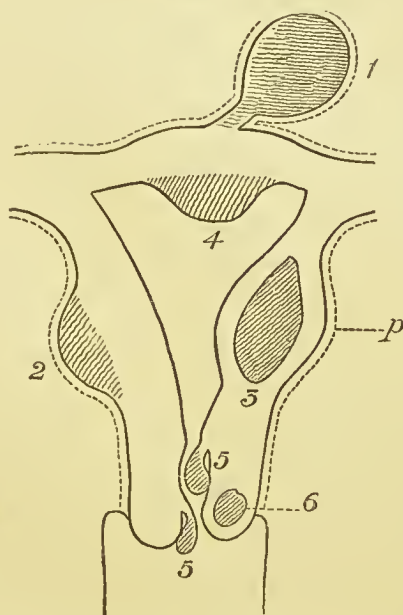
(a) In the hard there is an excess of fibrous tissue with a certain proportion of hypertrophied unstriped muscular fibre. This gives it a distinctive hardening as compared with the uterine wall. When cut into, the surface presents a glistening greyish-white colour with several bundles of fibres arranged concentrically and cut across, like the wires in a submarine cable. A kind of capsule to the growth is formed by a layer of loose connective tissue in which the nutrient blood-vessels ramify. None, however, penetrate into the substance of the tumour: this is an important anatomical fact, for it explains the easy control of hæmorrhage by ligature of the vessels of the capsule, and the ease with which enucleation can be performed in certain cases.

(b) The soft variety consist almost entirely of unstriped

muscular fibre cells, in fact they are collections of true uterine tissue. They have no distinct capsule, and usually occur at the fundus of the uterus.

(iii.) **Position.**—They usually occur in the body of the uterus, less frequently in the cervix. As a rule they are multiple rather than single, and occur most commonly in the posterior wall. They always originate in the substance of the muscle wall, and if during

FIG. 95.



Composite diagram indicating the varieties of fibro-myomata of the uterine body and cervix.

- | Uterus. | Cervix. |
|---------------------------------|------------------|
| 1. Pediculated subserous. | 5, 5. Submucous. |
| 2. Sessile subserous. | 6. Interstitial. |
| 3. Interstitial or intra-mural. | p. Peritoneum. |
| 4. Submucous. | |

their growth they remain embedded in the parietes we have the so-called *interstitial* or *intra-mural* variety (Fig. 95 : 3).

Should they grow outwards towards the peritoneum they become subserous, and may remain sessile or become pediculated (Fig. 95 : 1, 2). If, on the other hand, growth takes place towards the uterine cavity, the tumour will be covered by endometrium and is termed a submucous fibroid (Fig. 95 : 4). Should this become pediculated, it will always be found partially or entirely in the cervix uteri and never completely in the uterine cavity. It is

then called a mucous fibroid *polypus* or pediculated submucous fibroid (*vide* p. 164); the so-called pedicle is, however, only a stretching of the muscular tissue owing to the growth having entered the cervix uteri.

(iv.) **History and Progress of a Fibro-myoma.**—Growth is as a rule extremely slow. Pregnancy and climatic changes, chiefly from cold to hot, may produce a great increase in its rapidity. Increase ceases after the menopause, which is, however, usually delayed. After labour complete or partial absorption may indubitably occur. *Gangrene* only takes place when the fibroid is of the submucous variety, and especially when being extruded at the os uteri. A similar condition may result from torsion and nutrition-changes in the pedicle. Spontaneous expulsion takes place as a consequence of uterine contraction, as for instance when the pedicle tears across in the submucous variety or when an interstitial fibroid is extruded into the uterine cavity. This phenomenon is called spontaneous *enucleation*. *Purulent degeneration* in the interior of a submucous or interstitial fibroid is occasionally met with, and may simulate pyometra or abscess of the uterine wall respectively. Should suppuration take place in a pediculated subserous fibroid, the likeness to a suppurating ovarian cyst will be evident. *Calcification and softening* from fatty degeneration occur in certain instances, also *cystic* change, producing the so-called fibro-cystic tumour. *Fatty changes* have of late been shown to be present in the heart as the result of large fibro-myomata, and independent of hæmorrhage.

The mode of growth is of great importance when treating of the subserous form. It may grow upwards—which is the most favourable course—and a tumour of enormous dimensions may produce no more inconvenience to the heart's action or respiration than the uterus in advanced pregnancy. Should the growth be pediculated and torsion of the pedicle take place, all the symptoms of torsion and strangulation of an ovarian cyst will occur. If, on the other hand, growth tends in a downward direction, the pelvic cavity is encroached upon, and as in retroverted pregnant uterus, we have a growing tumour confined in a limited bony cavity; incarceration results, with all its attendant symptoms.

The formation of adhesions between the tumour and the intestines is much less frequent than with ovarian cysts.

A pediculated submucous fibroid may occasionally produce partial or complete inversion of the fundus uteri (*vide* Fig. 93, c).

(v.) **Influence upon Menstruation, Pregnancy, Labour, and the Puerperium.**

(a) *Menstruation.*—This has already been alluded to in

Chapter v. p. 69, and the dysmenorrhœa occasioned by the presence of a fibro-myoma in the uterine wall was explained.

Observations show us that a fibro-myoma is smallest immediately after the cessation of the flow: that increase to an acme gradually takes place up to the onset of the succeeding period, diminution ensuing while the flow lasts.

(b) *Pregnancy*.—Fortunately a large proportion of married women possessing fibroids are sterile—33 per cent.—and those in whom pregnancy occurs are very liable to abortion, especially in the submucous variety. Pregnancy may, however, go to full term without any untoward symptoms arising, as in the case of a subserous tumour of the fundus; intense pain may arise in other cases, probably from adhesions, pressure or tissue-stretching necessitating the induction of premature labour. But in pregnancy complicated by a subserous or interstitial growth low down in the posterior wall, retroversion and incarceration may result. As a rule, the growth of a fibro-myoma is stimulated by pregnancy, and a small unnoticed tumour may attain to considerable proportions and give rise to great distress; it has been found that there is frequent malposition of the fœtus, leading to increased foetal mortality.

(c) *During Labour*.—A fibro-myoma may produce dystocia or difficult labour—first, from its interference with regular uterine contraction (*i.e.*, uterine inertia); and secondly, by acting as a mechanical obstacle to the delivery of the child. This is most likely to occur with a pediculated subserous fibroid prolapsed into Douglas's pouch, with an interstitial variety in the lower third of the posterior wall, or lastly, with a fibroid growth in the cervix. The various treatment and operations for the relief of these conditions will be found in any text-book on obstetric medicine.

(d) *Puerperium*.—Post-partum hæmorrhage is likely to occur from inefficient uterine contraction. The placenta may be prævia or firmly adherent to the tumour. A fibroid, especially if subjected to traumatism, is liable during the puerperium to slough, septicæmia and death being the result; subinvolution usually occurs. As already stated, it is certain that fibro-myomata may in some cases be entirely absorbed after labour.

(vi.) *Symptoms*.—The severity of the symptoms is not proportional to the size of the tumour; indeed, very large growths, almost always of the subserous variety, may exist without producing any discomfort, an accidental examination only revealing their presence; interstitial fibro-myomata occasionally occur without any untoward symptoms, submucous extremely rarely.

(a) *Hæmorrhage*.—This may without doubt be looked upon as the symptom of fibro-myomata: it is usually present in the in-

terstitial variety and rarely absent in the submucous. The anæmic appearance, swollen feet, and puffiness of the under eyelids, frequently observed in patients with bleeding fibroids, are the result of this loss. Hæmorrhage may occur either as a gradually increasing amount of ordinary menstrual flow (menorrhagia), its site of origin being the thickened endometrium of the general uterine cavity, or there may be sporadic losses of varying quantity during the intervals (metrorrhagia), which are generally due to local ulceration of the mucous membrane *over* the tumour.

(β) *Dysmenorrhœa*.—This symptom has already been treated of in Chapter v. p. 69; it appears usually in the submucous variety, which acts as a foreign body and sets up uterine contraction to expel it. Should it accompany the interstitial form, it would be due to interference with normal painless uterine contractions, substituting irregular and painful ones.

(γ) *Leucorrhœa* may vary from a clear watery and irritating discharge to the ordinary form due to chronic endometritis; fœtor may be present, owing to retention and putrefaction of clots in the uterine cavity or the vagina.

(δ) *Pressure Symptoms*.—Fibroids by their mere weight may be productive of a feeling of bearing-down, often spoken of as “pelvic uneasiness or distress”; the peritoneum may be stretched by the growth or become inflamed, producing the so-called “peritonitic pain.” Neuralgia is very common.

As fibro-myomata may grow upwards into the abdominal cavity or downwards into the pelvic cavity, we get corresponding symptoms of pressure. Upward pressure symptoms are not common, even if tumours of the size of pregnancy at term are present; this is due to their slow growth and the ability of the respiratory and digestive functions to adapt themselves to the new condition.

Downward pressure symptoms are common and may be of very serious import; they are due to various viscera and structures being pressed upon or their functions interfered with. The bladder may be irritated by a fibroid in the anterior wall and cystitis ultimately result, or retention take place from pressure near the neck; this viscus is usually drawn up into the abdomen when large growths exist. The rectum may be pressed upon, producing constipation and tenesmus with hæmorrhoids, or the ovary be squeezed between the tumour and the pelvic wall. The vagina may be encroached upon and pressure upon the urethra exerted. In rare cases, interference with one or both ureters has occasioned hydronephrosis.

Pressure on the veins in the pelvis will produce œdema and venous engorgement, and on the nerves, neuralgia, and local trophic

changes in the skin, such as local anæsthesia or hyperæsthesia, but very rarely paraplegia.

Should incarceration take place, all these symptoms will be exaggerated.

(ε) *Sterility*, and if pregnancy does occur, early abortion.

(vii.) **Physical Signs.**—Should the fibro-myoma be sufficiently large to be felt above the pelvic brim, certain well-marked features can be made out. Examination should be performed carefully, as directed in Chapter ii. On palpation a firm, smooth, hard mass can be felt: it may not be painful to touch, or extremely sensitive, especially just before and during the catamenia; more or less mobility may be detected. If the surface be carefully examined, at certain spots small globular bulgings in many cases may be discovered; these are secondary growths; the abdominal veins are not enlarged. The tumour may be median in position, lateral, or stretching right across the hypogastrium; the percussion note over the tumour is absolutely dull, while there is resonance in the flanks. The stethoscope usually gives a uterine souffle, most marked laterally, synchronous with the patient's pulse and simulating the souffle of the pregnant uterus.

By bimanual examination, the uterus is more or less enlarged and increased in weight; a tumour apparently in close connection with it may be recognised growing from the posterior, anterior or lateral wall, and felt in the corresponding cul-de-sac. In large tumours the cervix is usually drawn up out of the pelvis and projects very little into the vagina, and is therefore difficult to make out by the examining finger; the characteristic pregnancy-softening rarely exists. The sound may be introduced easily, or, more commonly, with great difficulty, owing to the irregularity of the uterine cavity: it may pass a distance slightly or many inches over the normal; a solid gum-elastic bougie usually passes more easily and follows the direction of the uterine canal, however much it may be distorted.

(viii.) **Differentiation.**—This will best be treated of according to whether the tumour is (A) pediculated subserous; (B) sessile subserous or interstitial; (C) submucous.

(A) A pediculated subserous fibroid is almost indistinguishable from a tense-walled ovarian cyst; the very large abdominal fibromyomata are frequently of the sessile subserous variety.

(B) (a) Where the fibroid is small—i.e., not larger than an orange, or (β) when it is large and has risen above the pelvic brim.

(a) A small fibro-myoma must be differentiated from:

1. Subinvolution (p. 140);

2. Ante flexed uterus with or without metritis (Fig. 88);

3. Retroflexed uterus (Figs. 90, 91);
 4. Early intra-uterine pregnancy (*vide* Appendix);
 5. Prolapsed and enlarged ovary fixed by adhesion (Fig. 92);
 6. Early extra-uterine gestation;
 7. Small encysted intra-peritoneal hæmatocele;
 8. Pelvic cellulitis (parametritis);
 9. Fæcal accumulations;
 10. Cancer or sarcoma of the uterine body;
 11. Double uterus.
- (β) A large fibro-myoma must be differentiated from:
1. Ovarian tumour;
 2. More advanced intra-uterine pregnancy (*vide* Appendix);
 3. Extra-peritoneal hæmatocele;
 4. Pelvic cellulitis, and this leading to pelvic abscess;
 5. Intra-uterine pregnancy after the third month;
 6. Hæmatometra, or pyometra;
 7. Hydatiform degeneration of the chorion.

In all the above the diagnosis must be made by first paying regard to the history of the patient, then considering the physical signs present.

Suddenness of onset or the reverse, amenorrhœa, the result of examination by the sound, presence of pain, or high temperature, auscultatory signs, mobility or fixation of the uterus, are all of the highest importance.

An anæsthetic is often necessary to make a complete diagnosis.

(C) A submucous fibroid may become pediculated and pass through the os uteri into the vagina; it is then commonly called a "fibroid polypus," and protrudes in the form of a smooth polypoid mass, of the size of an egg.

It must be differentiated from:

1. Inversion of the uterus (p. 154);
2. A malignant polypus;
3. Fibroid polypus of the cervix (p. 170).

Inversion may be complicated by or produced by a fibroid polypus. A malignant polypus may be a portion of an intra-uterine growth, or arise from the cervix; it breaks down easily under the finger, and there is free hæmorrhage. If a submucous fibroid remains in the uterine cavity, dilatation of the cervix uteri by means of Hegar's dilators (Chap. vii.) is necessary to complete the diagnosis.

(ix.) **Treatment.**—This will vary with the position of the tumour, and therefore, whether the growth is:

- (1) Submucous (pediculated or sessile);
- (2) Subserous and pediculated;

(3) A submucous fibroid of the cervix.

(4) Subserous and sessile, or interstitial.

(1) As regards this class, treatment doubtless consists in removal of the tumour. When it presents at the os uteri or lies wholly in the vagina, it is a sufficiently simple matter; by some it is recommended to seize the growth with a volsella, having drawn it down somewhat, then to cut through the pedicle with scissors; the stump retracts, being composed of muscular tissue, and scarcely any vestige remains on the uterine wall to mark its origin. There is, however, some risk of hæmorrhage, and the better plan seems to be removal by slowly cutting through the pedicle with a blunt wire loop. The *écraseur* is a scientific snare; the loop, made of pianoforte wire, should be bent according to circumstances, and passed up over the tumour as high as possible into the uterine cavity; the os uteri is generally sufficiently dilated in these cases for that purpose. The wheel or handle at the extremity of the instrument should then be screwed up until the wire loop grasps the pedicle, a few further rotations will result in the wire cutting its way through the tissue, and the tumour will be separated (Fig. 96).

Should the cervix be undilated and the tumour sessile, or with a short stalk only, Hegar's dilators up to full size must be used; then an *écraseur* with a thin top-piece inserted, with the loop over the tumour, and removal performed in the same manner. If there is not sufficient pedicle to allow of the wire being passed round it, a free incision into the tumour with Paquelin's cautery or the knife across its whole breadth, may stop hæmorrhage, and lead to its spontaneous enucleation.

Scraping the hypertrophied endometrium both at the base of the tumour and over the uterine cavity with a sharp curette, often stays the hæmorrhage and the copious discharge.

The operation of avulsion or enucleation is a dangerous one, but may be undertaken under certain conditions: it consists in dilating the cervix, incising the capsule of the tumour, and separating

FIG. 96.



Wire *écraseur*, with two head-pieces of smaller size.

it from its attachments either with the fingers or Simon's spoon-saw, afterwards packing the cavity left with antiseptic gauze and changing this from time to time until granulation has closed it. Antiseptic douching and manipulation must be scrupulously observed throughout.

(2) If the tumour is subserous *with a pedicle*, it may simulate an ovarian cyst, and may be removed by mistake by ovariectomy. These growths give rise to no symptoms as a rule, and hence require no treatment. They may, however, undergo acute torsion of the pedicle, or other symptoms may arise necessitating their removal; the abdomen is then opened, and the pedicle ligatured as in normal ovariectomy.

(3) A submucous fibroid of the cervix may assume large proportions, especially during pregnancy, and may present an insuperable obstacle to the normal termination of labour.

Enucleation is the best method of treatment, which may be performed before labour or even during it. A free incision is made into the capsule, and the growth separated by the fingers from its attachments and removed; the cavity is packed with antiseptic gauze and allowed to granulate up.

(4) When we have a sessile subserous or an interstitial fibroid to deal with, scarcely any of the above methods can be resorted to. The most frequent and dangerous forms are included in this class.

We have choice of the following:

A. By vaginal operation—

- (1) Palliative, medication;
- (2) Incision of the mucous membrane over the tumour;
- (3) Simple dilatation of the cervix,
- (4) Treatment by electricity.

B. By abdominal operation—

- (5) Removal of the normal ovaries, to arrest menstruation;
- (6) Hysterectomy.

A. (1) *Palliative* means should be conscientiously carried out for a prolonged period before deciding on operative interference.

The chief symptoms requiring treatment are hæmorrhage, dysmenorrhœa, pain and increase in the size of the tumour, which may in some cases be rapid.

We have two drugs which are doubtless of service, they are ergot and bromide of potash. They can be given together with advantage in some cases, and a very useful mixture is—

R. Extr. Ergotæ liq.		5ss
Potass. Bromid.		gr. x
Mist. Camph.		ʒj

Two tablespoonfuls to be taken thrice daily.

But ergot can be administered more scientifically by means of subcutaneous injection of its alkaloid ergotin, gr. ij to iij; it may be injected into the muscles of the buttock, or into the tumour itself, never into the subcutaneous tissues, as abscesses are liable to result: this should be repeated twice a week for a month, then once a week for the same time. The theory of this treatment is that muscular contraction and constriction of the vessels are set up, and so a diminished blood-supply to the tumour follows. *Hydrastis canadensis* and *hamamelis* are said to be of service in some cases.

Purgation by means of *magnesiae sulphas*, *sodæ sulphas*, or decoctum aloes co. should be carried out regularly, so that as much fluid as possible may be carried off by the bowel.

Rest in bed in the dorsal position, with the hips and legs raised, is often sufficient to arrest hæmorrhage.

The genu-pectoral position, for from four to six hours a day, will be useful where a fibroid becomes impacted below the promontory of the sacrum.

If there is a feeling of much weight and bearing-down, and indications of the pelvic viscera or vessels being pressed upon, a watch-spring ring pessary will relieve these symptoms by pushing up, or at any rate supporting, the tumour; an abdominal belt often gives great relief.

If possible the patient should pay a visit either to Kreuznach, Schwalbach, or Woodhall Spa, places which owe their efficacy to the emptying of the pelvic vessels and so relieving the venous congestion.

Reposition may be necessary when the tumour becomes temporarily impacted in the pelvis.

Hot-water douches, given night and morning, are of great service; if the hæmorrhage is very severe, plugging of the vagina with antiseptic gauze may be necessary to save the patient's life.

(2) and (3) Incision of the tumour and simple dilatation of the cervix have often resulted in entire arrest of hæmorrhage and of all other symptoms.

(4) The so-called "*electrical*" or "*Apostoli's*" treatment is now on its trial. In many cases of fibro-myomata it is quite useless, while in others there seems to be very strong evidence of its efficacy. There are two methods of applying it: (1) by puncturing the tumour with one of the electrodes; (2) by passing the electrode into the uterine cavity. Puncture and the passage of a negative current was thought to produce absorption of the tumour, but this has not been proved, and there is much danger from consequent sloughing of the fibroid.

The intra-uterine treatment is the one now generally adopted,

and it is doubtless of great value in certain cases of severe hæmorrhage. The positive pole is inserted into the uterine cavity, the other being placed on the patient's abdomen by means of a metal plate embedded in wet clay; a current *measured exactly* by a galvanometer is then passed through the fibroid; it is usual to begin with a strength of from 60–80 milliampères, and to gradually increase it up to 150 m. or 200 m. A sitting should occupy ten minutes and take place once or twice a week, and be continued for six weeks. There is ample proof to show that, in a certain number of cases, hæmorrhage quite ceases and the fibroid disappears, cure being permanent: in others the cure may only be temporary, while in others again it fails altogether.

The objections to this treatment are the great amount of time necessary, the costly instruments, and the necessity of a thorough knowledge of electrical currents. These naturally put this treatment out of the hands of all but a few specialists.

B. *Operative Treatment by Abdominal Section.*—(5) The removal of normal ovaries to arrest menstruation and so produce an artificial menopause is of great importance; in a successful case, the patient who has been losing profusely, either immediately or gradually after the operation, ceases to bleed, goes through all the symptoms of an artificial menopause, and attains, in fact, a condition of good health. Examination will show that the tumour has disappeared or become very much smaller. Unfortunately, this is not the sequel in a large number of cases: menstruation and hæmorrhage going on just the same. Contra-indications for this mode of procedure are—

- (1) Proximity to the normal menopause—that is, if a woman with a hæmorrhagic fibroid has reached the age of 44, it would be better to wait and see if a natural menopause occurs and thus cures the patient: it must, however, be remembered that this physiological event is usually delayed when fibroids are present.
- (2) Rapidly growing fibroids of the soft variety are rarely benefited by this treatment.

It must be borne in mind that although the case may be apparently a suitable one, on opening the abdomen, the ovaries cannot be got at or even felt, owing to adhesions or dislocation.

The operation is therefore indicated in young women with slowly growing hæmorrhagic fibroids, interstitial or sessile subserous in variety, and where the operation of hysterectomy is looked upon as a last resource, or by reason of the impossibility of making a pedicle that operation is deemed inadvisable.

(6) *Hysterectomy.*—This is the last resource for the patient,

and consists in opening the abdomen by a very free incision, turning out the tumour, and tying the broad ligaments so as to control hæmorrhage; the base of the tumour is then surrounded, usually at the site of the internal os uteri, with a *serre-nœud* held by means of a clamp, which tightens up the loop: the growth is then cut away, the stump brought out at the abdominal wound, and the incision closed; the portion above and a certain amount below the clamp will slough away, and the cervix thus becomes firmly attached to the posterior surface of the abdominal wall; this is the extra-peritoneal method and the safest.

In the intra-peritoneal method, the broad ligaments are ligatured and the mass cut away as before, but instead of bringing the stump out at the abdominal opening, the peritoneum is brought over the flaps, which are sewn together and the stump dropped into the pelvic cavity. There is great risk of hæmorrhage, and although it is surgically correct treatment it is less frequently resorted to.

This operation is often very difficult or inadvisable where the fibroid involves the cervix, the formation of a pedicle being then impossible.

Practical deductions—

1. If a tumour be submucous (pediculated or sessile), remove it after the method given on page 165.
2. If it be subserous (pediculated or sessile), but quiescent, leave it alone.
3. If interstitial or a sessile subserous (growing), try prolonged palliative treatment, then Apostoli's method.
4. If this fail, dilatation of the cervix.
5. Finally, removal of the ovaries, or hysterectomy.

UTERINE POLYPI.

Much confusion has always surrounded the nomenclature of these growths.

They may be classified as follows:

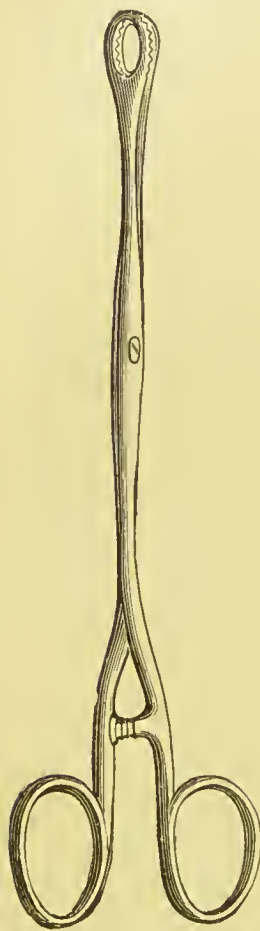
1. True or mucous.
2. Spurious, which may be—
 - a. Malignant polypus;
 - β. Fibinous polypus;
 - γ. Placental polypus.
3. Submucous fibro-miomata which have become pediculated (*vide* p. 164) = fibroid polypi.

Definition.—A uterine polypus is a tumour covered by uterine mucous membrane; it is attached to the uterus by means of a

pedicle or stalk, and originates from some pathological growth of the tissues of that organ.

1. **The True or Mucous Polypus** is generally found to arise from the mucous membrane of the cervix (Fig. 95 : 5), though sometimes from that of the uterus ; it rarely assumes large proportions, the usual size being that of a filbert, and it seldom occurs alone. In colour, by the speculum it is bright red, and may bleed on being touched ; to the examining finger it is soft, and may be sometimes overlooked. It may be composed of hypertrophied glands or connective tissue. One variety is due to a Nabothian follicle becoming distended and pediculated.

FIG. 97.



Polypus forceps.

Symptoms.—Sometimes none arise, and the existence of a polypus is only discovered by chance. Their presence may be indicated by :

1. Hæmorrhage ;
2. Leucorrhœa ;
3. Sacralgia ;
4. Dysmenorrhœa ;
5. Sterility.

Excessive hæmorrhage at the monthly illnesses, and between them, is the most usual.

Treatment.—This depends upon whether the polypus is presenting at the external os uteri, or whether it is intra-uterine.

If the former, it should be seized with a pair of polypus forceps (Fig. 97), and twisted off.

If intra-uterine, the blunt wire curette will often detach them if they have a thin pedicle ; otherwise dilatation by Hegar's bougies is necessary, and removal by the écraseur or polypus forceps, an antiseptic intra-uterine injection being given after the operation.

2. **Spurious Polypi.**—What is termed a *placental polypus* is a piece of placenta left after labour or abortion, on to which one or more layers of fibrin have been deposited ; the mass projects by a broad base from the uterine tissue, but is not covered by mucous membrane.

A *Fibrinous Polypus* is not necessarily the sequela of pregnancy ;

it consists of layers of fibrin superimposed upon the remains of some morbid growth, as the stump of a polypus recently removed.

Both of these behave much as does a true polypus; they produce hæmorrhage, and often offensive discharge, and are always intra-uterine in origin, though they may present at the external os uteri.

The treatment consists in twisting the growth off by a polypus forceps, with the usual antiseptic precautions.

A *Malignant Polypus* is usually indicative of a growth arising from the cervix or uterine cavity, and presenting at the os uteri after developing a pedicle. For instance, a sarcoma arising near the Fallopian opening, may present in a polypoid form at the external os uteri. It bleeds easily on touching, and is more granular to the eye than a simple polypus; microscopical examination, of course, establishes the diagnosis: treatment will be discussed under "Cancer of the Uterine Body" (Chap. xiv.).

3. Fibroid polypi have already been described.

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CHAPTER XIV.

AFFECTIONS OF THE UTERUS—(*continued*).

VII. Malignant Disease.

Malignant Disease of the uterus may occur in the form either of cancer or sarcoma, and it may attack—first, the cervix; or second, the body.

When we speak of malignant disease of the *uterus*, we imply as a rule that the cervix is primarily affected; this is in consequence of 98 per cent. of all cases originating in that organ; the body of the uterus may be attacked secondarily to the cervix, but in only 2 per cent. primarily.

(a) OF THE CERVIX.

(1) **Causation.**—Cancer appears to be most frequent during a woman's child-bearing period—*i.e.*, from 25 to 40 years of age—but statistics seem to show that it is not uncommon as late as 60. It does not occur *before* puberty, and rarely until after 20.

Anything which tends to lower the general bodily health should be considered as a predisposing cause: it is more frequent among the poor than the rich. Women with large families are certainly more liable to it than nulliparæ: there seems some foundation for the supposition that lacerations of the cervix up to the vaginal roof may act as starting-points of the disease, possibly by irritation. The influence of hereditary taint seems to be over-estimated. Black races enjoy a comparative immunity from cancer.

(2) **Pathology.**—Malignant disease of the cervix may occur either as—

- (a) Carcinomata. { 1. Glandular or malignant adenoma;
2. Epithelioma, usually squamous;
3. Scirrhus and Encephaloid more rarely.

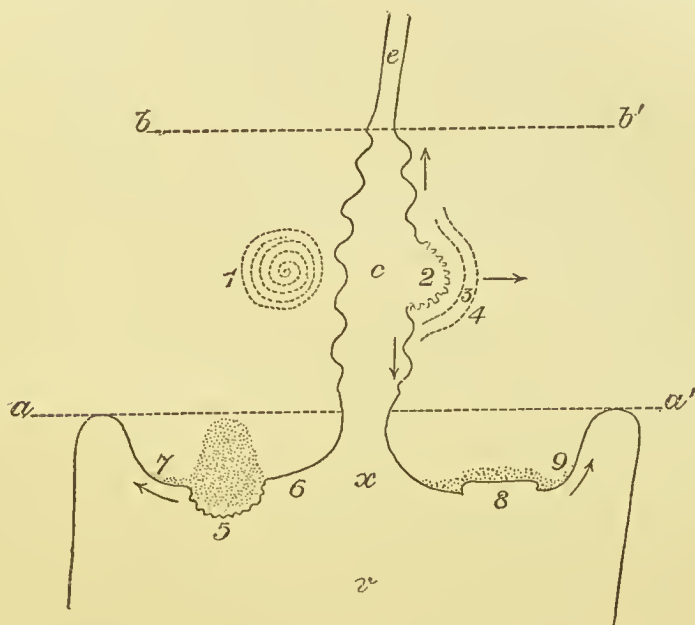
(β) Sarcoma, extremely rarely.

Glandular *Carcinoma* arises by proliferation of the gland tissues

in the substance of the cervix, producing thickening and hypertrophy. It may break down and form an ulcer—the cancerous ulcer.

Epithelioma (or canceroid) may arise from the cubical epithelium

FIG. 98.



Composite diagram of the origin and mode of extension of malignant disease of the cervix.

- | | |
|--|---|
| <i>a a'</i> . All the cervix below dotted line = <i>portio vaginalis</i> . | 4. Zone of small-cell infiltrating tissue. |
| <i>b b'</i> . All the cervix below dotted line and above <i>a a'</i> = <i>portio supra-vaginalis</i> . | 5. Epithelioma commencing in the deeper layers of the portio vaginalis, and projecting on the surface as a cauliflower excrescence. |
| <i>c</i> . Cavity of uterine body. | 6. Healthy tissue around os uteri externum. |
| <i>c</i> . " cervix uteri. | 7. Tissue with commencing infiltration. |
| <i>x</i> . Is placed just below the os uteri externum. | 8. Epithelioma breaking down into an ulcer. |
| <i>v</i> . Vagina. | 9. Infiltration tissue. |
| 1. Carcinomatous nodule arising in the substance of cervix. | |
| 2. A similar nodule, broken down. | |
| 3. Zone of mature cancer tissue. | |

The arrows denote possible modes of extension of the disease.

of the cervical canal, or from the deeper layers of the squamous epithelium of the *vaginal* aspect of the cervix; in the latter case, it assumes the papillary form or cauliflower excrescence.

It is extremely difficult to localise the site of origin of cervical

cancer owing to the late stages of the disease at which patients seek for relief; but from examinations made during the earlier stages it seems it may appear:

1. On the vaginal portion of the cervix either as a cauliflower excrescence or an ulcerating surface;
2. As hard nodules in the substance of the cervix and beneath the mucous membrane: these nodules as they grow, approach the surface and break down.

(3) **Mode of Extension.**—Usually there is a tendency for the disease to creep along the vaginal roof on to the walls of the vagina—*i.e.*, downwards. It may pass upwards into the cervical canal and thence infect the endometrium of the body. Lastly, it may pass outwards into the connective tissue about the cervix, and the cellular tissue between the layers of the broad ligaments (Fig. 98).

These facts are of extreme importance as they influence the prognosis and the operative measures possible: it is obviously doubtful treatment to remove the whole uterus for cancer of the vaginal portion of the cervix which is tending to spread on to the vaginal walls; and it is just as useless to remove the cervix alone when the cancer has already invaded the endometrium of the body. On the other hand, there seems to be a growing opinion among pathologists that if cancer has attacked any organ, the more of it that can be removed, the less chance is there of recurrence; the treatment of very early cancer of the cervix will be discussed later.

By the cancer spreading, the various viscera in the neighbourhood of the cervix become gradually invaded as the disease progresses.

1. The *bladder* is most usually involved; this is caused by infiltration of the connective tissue between the cervix and the bladder, and just above the anterior fornix: the bladder mucous membrane becomes affected, ulcerates, and a vesico-vaginal fistula results. This occurs in about 40 per cent. of all cases.

2. The *ureters* from their close anatomical relations to the cervix (Fig. 15) are sometimes pressed upon or occluded, producing all the usual train of symptoms dependent upon hydronephrosis and dilated ureters.

3. Implication of the *rectum* with formation of a recto-vaginal fistula is more rare.

4. The peritoneum may be attacked, but the cavity is never opened into; this is due to the formation of adhesions between the inflamed and irritated membrane and the advancing growth, which quite shuts it off.

Beside this extension by actual contact, the disease may become

disseminated through the lymphatics, as in other situations (Chapter i. p. 28).

(4) **Symptoms.**—Cervical cancer may have advanced to an incurable stage without anything untoward arising. But as a rule one of the following local signs is recognised :

1. Hæmorrhage.
2. Discharge.
3. Pain.

There seems no doubt that a greater or less *loss of blood* is the earliest indication of commencing disease, but the author recalls a case in which a slight “show” for two or three hours was the only sign which attracted the patient’s attention, and yet on examination a mushroom-shaped growth involving the anterior and posterior lips of the cervix was found ; should hæmorrhage occur after sexual connection, a fact patients are naturally shy in referring to, considerable importance should be attached to it.

The discharge commences as a non-irritating yellow leucorrhœa, and may be blood-stained ; when breaking down of the cancerous tissue and ulceration occurs, the discharge usually becomes watery and extremely offensive ; by its continual passage over the vulva, soreness and pruritus are produced.

Cervical cancer may have progressed considerably without any sign of *pain*, and indeed this may be included among the later indications. It is usually referred either to the base or apex of the sacrum, producing a variety of sacralgia : the lower hypogastrium, Poupert’s ligament, the pudendum, and the front and inner surfaces of the thighs are less frequent sites of pain. Various local neuroses may be produced, from pressure on branches of the sacro-sciatic plexuses, such as spots of anæsthesia or hyperæsthesia. There may be “painful sitting” or “lying down.” The pain varies in intensity, being in some cases not severe enough to call for treatment, in others, excruciating and requiring large and increasing doses of narcotics to relieve it ; exacerbations often occur at night.

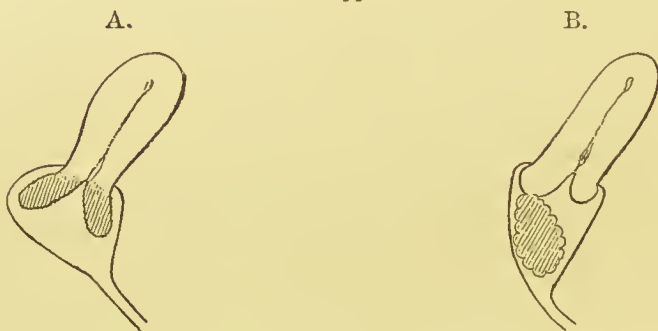
If the bladder or rectum becomes involved and fistula result, additional distress will be caused by the passage of urine and fæces over the already inflamed vagina and vulva ; painful defecation and micturition are not infrequent, and occlusion or obstruction of the rectum may be occasioned by the pressure of a cancerous mass.

Constitutional Symptoms appear as the disease progresses ; general debility, with wasting from the advance of the growth and from the hæmorrhages, and loathing of food are frequent. The colour of the skin becomes dirty yellow, producing the so-called cachexia. The face has an anxious and pained expression.

But it must be noted that the disease, although already too advanced for curative operation, is often accompanied by no facial cachexia. If the discharge is profuse and very offensive, symptoms of sapræmia or septic intoxication ensue, slight elevations of temperature, especially in the evenings, being observed. Death takes place from uræmia in many cases, general exhaustion, and peritonitis. The duration of the disease is proved by statistics of cases under observation to be about two years, but a much more rapid or a slower course may be pursued.

(5) **Diagnosis.**—The physical signs felt per vaginam vary with

FIG. 99.



A. Mushroom growth involving both lips of the cervix uteri. (From nature.)

B. Cauliflower excrescence growing from posterior lip of the cervix uteri, which is itself infiltrated and thickened. (From nature.)

the kind of growth met with. The disease may present itself to the examining finger either :

- a. As a fungating mass of a "mushroom-shape," and usually involving both anterior and posterior lips (Fig. 99, A) ;
- b. As a thickened and hardened cervix with an uneven and nodular surface ;
- c. As a cauliflower excrescence (Fig. 99, B) ; or
- d. As a more or less ragged ulcer, with hardened edges, on the anterior or posterior lip of the cervix.

On withdrawal of the examining finger, it will be found to be blood-stained, and in *a* and *c* free hæmorrhage may take place : a peculiar characteristic of *a*, *c*, and *d* is the granular sensation accompanied by breaking down of diseased tissue under the pressure of the finger.

The speculum, preferably Sims's, is only necessary in *d*. If used for purposes of demonstration, a more or less deeply congested granular mass of purplish colour will be found occupying the roof of the vagina, as in *a* and *c* ; free hæmorrhage and often fetid watery

discharge will be noticed. No characteristic sign can be made out by the speculum in *b*, as ulceration has not yet taken place.

The rectum should always be examined, especially in those cases where a large growth exists in the vagina and handling of it produces severe hæmorrhage; the mobility of the uterus and the involvement or not of the rectal wall can be tested in this way.

A most important sign, especially as regards the line of treatment to be carried out, is the *mobility* of the uterus. If the uterus is examined in the early stages of the disease, it will be found quite mobile: but as it spreads to the peri-cervical tissues, the connective tissue of the broad ligaments, or on to the vaginal roof, mobility is impaired or lost, the uterus becoming more or less fixed or moored to the pelvic wall.

A diagnosis should be made as soon as possible in any "suspicious" case. The microscope is of the greatest value here; the cervix should be exposed, a piece of the doubtful tissue removed with scissors, and a report made upon it by a competent pathologist.

(6) **Differential Diagnosis.**—It is only in the early stages of cancer that any difficulty of diagnosis arises: early malignant disease may simulate:

1. Hypertrophy and induration of the cervix. In this disease the Nabothian follicles become occluded and distended, giving rise to a nodular sensation;
2. A lacerated and cicatrised cervix with papillary erosion (p. 135);
3. A sloughing fibroid polypus, whether arising in the uterus or the cervix, may be taken for a mushroom growth or cauliflower excrescence;
4. Chancres of the cervix;
5. Sarcoma of the cervix,
6. A malignant polypus (as sarcoma of the body), protruding at the os uteri externum.

(7) **Modes of Treatment.**—Cases of cancer of the cervix can be divided into:

(A) Those in which there is reasonable ground for the possibility of removal of the disease by a radical operation—*i.e.*, curable;

(B) Those in which the advance of the disease renders any radical operation impossible—*i.e.*, incurable.

Taking class (A), this must necessarily include only the earlier cases of cancer.

There are two operations for such cases:

1. The supra-vaginal amputation of the cervix;
2. Total extirpation of the uterus.

Certain physical conditions are necessary for these to be undertaken: the uterus must be perfectly mobile, and the disease must not have spread to any extent on to the vaginal roof—i.e., there must be sufficient healthy tissue beyond the disease into which the incisions can be made.

FIG. 100.



Sharp-pointed
scissors.

(Curved on the
flat.)

The relative value of supra-vaginal amputation and total extirpation is at present not decided. When the disease is certainly limited to the portio vaginalis, the former is indicated; where the body is not enlarged, and the disease tends to spread laterally rather than into the endometrium, the former seems sufficient, although many authorities think it a useless proceeding; in those cases where the disease is distinctly taking an upward course, total extirpation is evidently necessary.

(i.) *Supra-vaginal Amputation of the Cervix.*—If there is a fungating growth in the vagina it is best to remove the most projecting portions at a preliminary operation, a week previously; this does away with much septic material, makes the major operation more easy, and indicates more clearly how much vaginal mucous membrane is encroached upon.

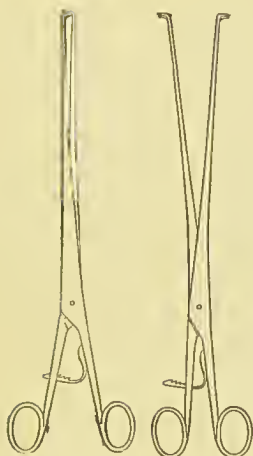
The patient is placed in the lithotomy position, and the legs separated by means of Clover's crutch. The vagina is then exposed by a Sims's speculum, and the mucous membrane thoroughly swabbed over with a 1 in 1000 perchloride of mercury solution.

The *instruments required* are a scalpel, sharp-pointed scissors, curved on the flat (Fig. 100), clamp forceps, a volsella (Fig. 101), an aneurism needle (button-hook shape) (Fig. 102), and retractors.

1. *Marking out the Incisions.*—Steadying the uterus by the volsella, but not putting any traction upon it, four incisions are marked out (Fig. 103) with a scalpel; if possible half an inch of healthy tissue must be included within them; 1 and 2 are semilunar, their concavities towards each other, the former with its convexity to the pubes, 3 and 3' join the extremities of 1 and 2, and are nearly straight.

Steps of the Operation.—The uterus must be pulled down as low into the vagina as possible: this may be performed either by fixing

FIG. 101.



(1) Expanding volsella
(author's pattern).

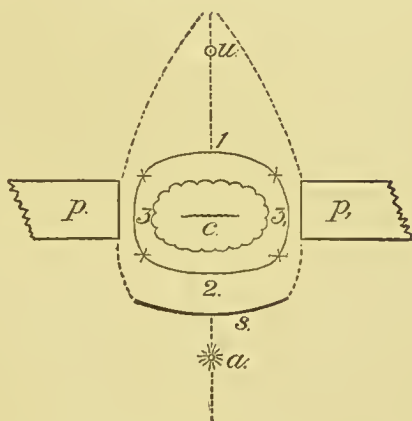
1. Instrument closed for insertion into cervical cavity.
2. Expanded, the hooks looking outwards.

FIG. 102.



Aneurism needle
(button-hook shape),
for passing ligatures
through the base of
the broad ligaments.

FIG. 103.



Supra-vaginal amputation of the cervix.

Diagram to show "marking out" incisions. (The patient in the dorsal decubitus.)

- | | |
|--|--|
| 1. Anterior to cervix. | <i>p p'</i> . Spatulae for retracting vaginal walls. |
| 2. Posterior to cervix. | <i>a</i> . Anus. |
| 3 3'. Lateral incisions. | <i>u</i> . Urethra. |
| <i>s</i> . Sims's speculum blade in section. | <i>c</i> . Diseased cervix. |

a curved volsella (Fig. 43) above the diseased portion, or by passing a dilating double hook into the cervical cavity: the instrument used by the author is figured on p. 179 (Fig. 101). A sound must now be passed into the bladder, to ascertain the exact relation of that viscus to the cervix (*vide* p. 52).

2. The cervix is pulled as far back towards the perineum as possible, and the sharp-pointed scissors are then pushed into the anterior incision (1); above this lies the cellular tissue, between the supra-vaginal cervix and the bladder; when the vaginal mucous membrane is cut through, separation should be effected by the finger-nail; the position of the uterus should be borne in mind, and the bladder-sound kept *in situ*, in order to verify the position of the parts; the peritoneal cavity is not opened.

3. The cervix is now drawn as much as possible towards the pubes; and the posterior lip separated from its peritoneal covering by means of the scissors: the author and some operators deliberately now open the peritoneum, and tear it to the right and left; others think this unnecessary. An antiseptic sponge with a string attached is passed through the wound into the abdominal cavity to keep the intestines out of the way, and to absorb any possible bleeding, the string hanging out of the vagina. The uterus is now free in front and behind; there should only be trifling hæmorrhage up to this time.

4. The anatomical relations of the blood-supply to the uterus must be remembered: the uterine artery and its branches run between the layers of the broad ligaments: if these can be secured no serious hæmorrhage should be met with (*vide* p. 25).

On cutting through the vaginal mucous membrane at the site of the lateral incisions (3 and 3') the bases of the broad ligaments will be laid bare. To ligature the vessels in them, an aneurism needle threaded with carbolie silk should be passed from below upwards (on the patient's left side) so as to include about half an inch of tissue: it should be tightly tied, the first knot being held by a Spencer-Wells's forceps until the second double one is secured: the tissue intervening between this ligature and the cervix may now be cut through, and no hæmorrhage should occur: another may be applied above this, so as to include half an inch more of the broad ligament, the ligature tied, and the tissue cut as before: a similar operation is done on the right side, the whole of the cervix is thus freed; some operators, instead of ligatures, apply Spencer-Wells's forceps at the site of the ligature, and cut between them and the cervix; they are allowed to remain twenty-four to forty-eight hours attached, and then removed.

5. The cervix is now excised by scissors at a level just above the internal os uteri (Fig. 104 b): some operators advise sutur-

ing the stump to the vaginal mucous membrane, but this seems an unnecessary prolongation of the operation. After searing the cavity of the stump with Paquein's cautery, packing it with sal alembroth gauze will complete the operation.

A less complete and satisfactory proceeding has been devised by Sims (Fig. 104, a).

At intervals during the course of the operation antiseptic flushing with a 1 in 4000 solution should be resorted to; the after-treatment consists in removal of the packing twenty-four hours after operation, and antiseptic douches twice daily, if considered advisable.

The dangers of the operation are :

1. Secondary hæmorrhage from the slipping of a ligature;
2. Peritonitis;
3. Wounding of the bladder, either ureter, or intestine.

(ii.) *Total Extirpation of the Uterus.*

—The position of the patient and the preliminary incisions are as in supra-vaginal amputation: the cervix is separated from the bladder wall and the peritoneum cut through, thus opening up the utero-vesical pouch. The posterior cul-de-sac is cut into and the peritoneum divided; the index-finger of the left hand can then be passed through the aperture, over the uterine fundus, and into the anterior cul-de-sac.

A sponge, with a string attached, is inserted as before, and the broad ligaments are tied by ligature or secured by clamp forceps. There seems to be a strong feeling in favour of the greater safety of the former. To tie the left broad ligament the cervix is pulled well over to the right side, the aneurism needle passed from below upwards as before, and after tying the ligature the intervening tissue is cut through: three others are passed, one above another, enclosing segments of the broad ligaments and contained blood-vessels, the left forefinger guiding the needle; the last loop should enclose the Fallopian tube. Having freed the uterus on its left side, the cervix is pulled over to that side and a similar proceeding gone through with the right broad ligament. The

FIG. 104.

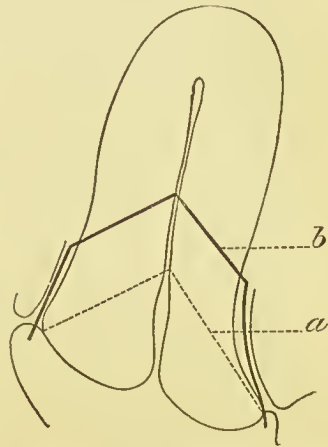


Diagram to indicate incisions, and amount of tissue removed in—

- a. Sims's operation for removal of cervix (dotted line);
 - b. Supra-vaginal amputation of cervix (thick line.)
- (The patient in the lateral decubitus.)

sponge is removed, and the whole uterus comes away easily: the ovaries are better left.

The stumps of the broad ligaments shrink towards the sides of the pelvis. Some operators sew up the opening in the peritoneum; this is, however, found to be practically closed in twenty-four hours without this proceeding, and the author cannot recommend it from his own experience.

The ligatures should be left long, and allowed to lie in the vagina. Antiseptic douching should be systematically carried out at intervals during the operation, it is unnecessary *afterwards*. A piece of antiseptic gauze is *laid* in the vagina, to act as a drain.

In four cases operated upon by the author, convalescence occurred without any fever or complication; but death from recurrent hæmorrhage, peritonitis, or shock is not uncommon.

Subsequent Course of the Case.—1. After either operation keep the patient under observation for at least two years.

2. See her every month, and examine the condition of the cicatrix: any bleeding after examination should be regarded as suspicious of recurrence.

3 Her weight should be taken every month: continued, though slight increase, is of very favourable import.

4. On the slightest suspicion of return of the growth examine the patient under an anæsthetic, and if accessible touch the diseased part freely with a Paquelin's cautery.

Recurrence in the broad ligaments is indicated by the formation of an irregular hardish mass at the side of, or in, the vaginal roof: in a case of the author's where return occurred six months after operation, the tissue broke down, and a copious flow of watery ascitic fluid took place through the site of the old cicatrix.

Physiological Changes following Total Extirpation.—(a) If the ovaries are left and the patient has not yet reached the menopause, although periodic hæmorrhagic discharge ceases, the process of ovulation goes on.

(b) At the time the catamenia should appear there are reflex symptoms present, such as headache, pain, vomiting, and neuralgia.

(c) Should the climacteric have been passed, no changes are produced by the operation.

(B) Those cases in which the advance of the disease renders any radical operation impossible—*i.e.*, incurable.

In this group no hope of cure is entertained, but much relief may be given by—

1. Partial operative measures;
2. Palliative treatment.

The chief Objects of Treatment in this class of case are—

1. To diminish the quantity and fœtor of the discharge;
2. To stay the bleeding at the time or prevent its recurrence;
3. To relieve the pain;
4. To treat any complications which may arise during the progress of the disease.

FIG. 105.

1. *The fetid discharge* is due to breaking-down and decomposing cancerous tissue: it is apt to produce a condition of sapræmia, in addition to much local soreness from its irritating nature. Should the discharge come from a mushroom-shaped growth, removal by means of a wire écraseur, or the knife and scissors, will be sufficient.

If there is no distinct mass to be thus treated, scraping by means of a Simon's sharp spoon is indicated (Fig. 105): care should be taken not to excavate too deeply, as the uterus, bladder, rectum, or peritoneal cavity may easily be perforated.

The application of caustics, such as chloride of zinc paste, 3j ad 3j, has been recommended, but in the author's experience more irritation is produced than good done; it may, however, produce a slough, which gradually separates, leaving a granulating surface beneath. The fœtor of the discharge may be neutralised by vaginal douches of sanitas or kreolin; being bland and non-irritating, they are preferable to carbolic or sublimate lotions; a pencil of iodoform and eucalyptus, laid in the vagina and allowed to melt, will tend to cover the mal-odour. An ointment of eucalyptus and vaseline smeared over the vulva relieves the smarting of the excoriated parts.

2. *To Stay the Bleeding*, we have ergot, which may be given in the form of a pill (p. 78) at regular intervals, and locally, plugging of the vagina; this must be carefully performed and through a Sims's speculum. Iron cotton-wool is very useful laid on the diseased part. The Paquelin's cautery may be applied freely to the diseased surface. The use of the curette for the offensive discharge, often temporarily arrests the hæmorrhage also.

3. *To Relieve Pain*.—This is only as a rule controlled by some preparation of opium: morphia given by the mouth, rectum, or



Simon's sharp spoon.

subcutaneous injection is the best form; it should be combined with belladonna; a suppository of—

Morphinæ Hydrochlor.	.	.	.	.	gr. $\frac{1}{4}$
Extr. Belladonnæ	.	.	.	.	gr. $\frac{1}{8}$
Ol. Theobrom.	.	.	.	.	q.s.

is a convenient form of administration.

Bromidia suits in some cases, hyoscyamus and chloral in others. Constipation, headache, nausea and loss of appetite follow the use of opium in any form, and it is found that when once begun it must be continued and in increasing quantities.

4. If the bladder or rectum be implicated, and a faecal or urinary fistula exists, antiseptic diapers or peat-moss pads should be applied over the vulva, and the patient kept on mackintosh sheets.

The administration of quinine and acid tonics, to improve the appetite, must be left to the discretion of the practitioner.

(β) CANCER OF THE BODY OF THE UTERUS.

This may occur as:

a. Carcinoma—either glandular or epitheliomatous;

b. Sarcoma.

a. **Carcinoma of the Body** is much less common than of the cervix.

(1) *Pathology*.—The malignant adenoma (*i.e.* glandular carcinoma) originates in the epithelium of the uterine glands, and may arise either from the mucous membrane of the uterus when the growth is polypoid and tends to grow into the uterine cavity, or in the deeper portions of the glands lying in the muscular tissue: in this case the disease takes an outward direction, producing nodular growths beneath the peritoneum. Adhesions may take place with the omentum and intestines.

Squamous epithelioma may occur, but it is very rare. It is worthy of note, that in this situation and also in the cervix (p. 172) carcinomata occur in what our present knowledge of development states to be mesoblastic tissue—differing from the generally accepted theory that this form of malignant disease is always either epi- or hypo-blastic in origin. Possibly our embryology is at fault, and the lining of these tracts (uterine body and cervix) is derived from some true epithelial source; or possibly there are “inclusions of epiblast” in the uterine wall similar to those which are supposed to give rise to dermoid cysts and carcinoma of the ovary.

(2) *Causation*.—Two facts only are ascertained on this question: they are that the disease usually attacks nulliparous rather than

parous women, and that the age of from fifty to sixty is a predisposing cause.

(3) *Symptoms* are as in cervical carcinoma :

Hæmorrhage, often profuse ;

Pain, which is present in the *earlier* stages (*cf.* cancer of cervix) ;

Discharge, which may be copious and offensive, or watery and irritating.

(4) *Diagnosis*.—The uterus is enlarged and freely mobile : the cervix, at first healthy, may be dilated. The sound should be used gently, and its passage over the malignant growth gives a grating sensation which is by some supposed to be characteristic ; hæmorrhage follows its withdrawal. If the cervix is sufficiently dilated to admit the use of a curette, the scrapings of the endometrium will give valuable microscopic evidence. If the cervix is closed, dilatation with Hegar's bougies or a tent is permissible until the finger can be admitted into the uterine cavity ; the state of the mucous membrane can then be easily ascertained.

In the later stages the uterus is fixed by adhesions and infiltration of the broad ligaments.

(5) *Differential Diagnosis*.—1. Fungous endometritis may be mistaken for malignant disease of the endometrium. 2. A sloughing submucous fibroid or polypus. 3. Retained products of conception.

(6) *Treatment*.—Palliative, by free curetting with the sharp curette.

Radical, consisting in total extirpation of the uterus ; the indications for resort to this operation appear to be :

1. Free mobility of the uterus ; this may be an uncertain guide in cases where the intestine only is adherent.
2. Non-implication of the cellular tissue of the broad or utero-sacral ligaments, as is proved by rectal and vaginal examination.
3. In nulliparæ the vagina is often small and undilatable, and the possibility of extracting the enlarged viscus, after freeing its connections, must be taken into consideration ; if the uterus be too large, then the vulva must be incised bilaterally, or a combined abdominal and vaginal operation undertaken.
4. There must be no signs of secondary growths in the pelvic glands.

b. Sarcoma of the Body is more frequent than sarcoma of the cervix ; it is, however, extremely rare, and diagnosis from carcinoma is impossible except by means of the microscope.

Malignant polypus, sometimes arising from a spot near the Fallopian orifices, is often sarcomatous. Secondary nodules affect the vagina and peritoneal cavity; metastatic deposits may be found in the lungs and liver.

Total extirpation, if undertaken early enough, is the only satisfactory treatment.

DECIDUOMA MALIGNUM.

Deciduoma malignum may be defined as a malignant change (with subsequent metastasis to other organs) taking place in the remains of the products of conception, whether they be placental, molar or even tubal. The disease was first described by Säger in 1888, but whether it arises in the foetal or maternal portion of the placenta, and is carcinoma or sarcoma, is at present undecided.

The clinical history is very clear. A very large number of these cases occur in young women; it is found that a molar pregnancy, especially the vesicular variety, is more prone to malignant change than any other. Uterine hæmorrhage, more or less profuse, occurring at a varying period after labour or abortion, is the earliest and most constant symptom; the bleeding is not continuous but comes on suddenly and without warning. A foetid discharge with passage of shreds may alternate with this. On examining the uterine interior, a reddish friable mass can be scraped away with the finger, leaving a distinct depression in the uterine wall. Rapid metastasis soon takes place, the deposits being most frequently found in the lungs and vagina.

If an early diagnosis is made, prompt treatment should be adopted and the uterus extirpated, if mobile; repeated curettings are to be avoided.

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CHAPTER XV.

AFFECTIONS OF THE PERITONEUM AND PELVIC CONNECTIVE TISSUE.

THESE consist of—

- I. Inflammation of the pelvic peritoneum = **Pelvic peritonitis**
or **Perimetritis**.
- II. Inflammation of, with exudation into, the pelvic connective
tissue = **Pelvic cellulitis** or **Parametritis**.
- III. **Pelvic hæmatocele**.

I. PELVIC PERITONITIS OR PERIMETRITIS.

This consists of an acute or chronic inflammation of the innermost layer of the pelvic floor (p. 20) : it rarely, if ever, occurs without pelvic cellulitis or parametritis as a complication, nor is this latter present without perimetritis in addition. A similar relation exists between pleurisy and pneumonia.

(i.) **Causation**.—*Predisposing* causes are, a former attack of a similar kind, and the existence of chronic ovaritis or salpingitis; in addition, any of the following direct causes are more liable to set up trouble than in a healthy person.

Direct Causes.—(a) *Labour, miscarriage, or abortion*, when complicated by sepsis: this is especially common after criminal abortion, and is a well recognised local lesion of puerperal septicæmia; nearly 50 per cent. of cases belong to this class.

(β) *Gonorrhœa*.—The patient having originally had specific vaginitis, the contagion spreads into the uterus and Fallopian tubes, and so on to the pelvic peritoneum; this may be the result of a latent gonorrhœa in the male—*i.e.*, where a man has contracted gonorrhœa, and thinks he is cured: he may be married as late as two years afterwards, and the excitement of sexual congress set up a gleet which has the virulent infective powers of gonorrhœa, and communicates to the woman a disease indistinguishable from that disorder.

(γ) *Chill* during or immediately before the onset of the menstrual flow (p. 64); this is in some cases due to a localised inflammation of the peritoneum over an inflamed ovary, or possibly to a regurgitation from the uterine cavity of menstrual blood into the Fallopian tubes and so into the peritoneal cavity, the ostia being patent.

(δ) *Traumatism*.—Passage of a dirty or infected sound, perforation, or injury of the uterine wall; injudicious use of sponge and laminaria tents; after opening an imperforate hymen; excessive coitus.

In all these four causes infection takes place through the uterine mucous membrane, then the Fallopian tubes, producing salpingitis, and finally peritonitis.

(ε) *Poisoning by douches or injections of mercury salts*, absorption through a lacerated perineum, or criminal attempts at abortion by injury or injecting strong mercurial solutions, are rare; in a case of the author's, although peritonitis was present the peritoneum was uninjured, and the condition appeared to be due to the gangrenous and sloughy condition of the rectum and bowel (a consequence of acute mercurialism), and septic absorption following.

(ζ) *Rupture of a Fallopian pregnancy*, or a *pyosalpinx*.

(η) *Localised peritonitis* may occur at the site of puncture of an ovarian tumour, or over the surface of the tumour and the neighbouring viscera. A painless form of local peritonitis always occurs around the stump after ovariectomy, binding the pedicle down. Tubercle or cancer of the body of the uterus or of the ovary usually produce peritonitis, but the presence of a fibroid more rarely.

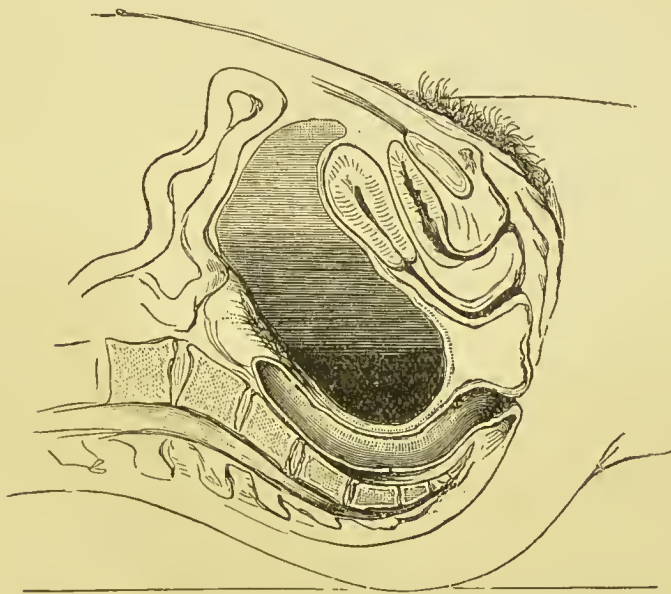
(ii.) *Pathology*.—In the simple or non-adhesive form of peritonitis, the peritoneum may present very little abnormality, and nothing beyond slight opaqueness or loss of the usual lustre can be made out.

If, however, the abdomen be opened during life or post-mortem in a case of puerperal peritonitis, the peritoneum will be found thickened and injected, the intestines distended to a greater or less degree, and adherent to each other and to the adjacent viscera by soft lymph, which easily breaks down on pressure; lying in the posterior cul-de-sac may be a collection of serous or slightly turbid fluid, containing flocculent shreds of lymph. Should the patient recover, this lymph becomes firmer, forming adhesions which mat the intestines together; they produce with other viscera, especially the uterus and rectum, adventitious cavities, which may contain serous fluid; this constitutes encysted serous peritonitis (Fig. 106);

should this fluid become purulent, as is not infrequent in septic cases, we have to encounter one form of "pelvic abscess."

The results of peritonitis may be very serious; the ovaries and tubes become bound down by adhesions, thus interfering with their mobility and functions. The ovaries may be prolapsed into Douglas's pouch and fixed there, while the tubes are distorted, and their calibre narrowed at different parts of their course, or obliterated, thus producing sterility, the occurrence of pyosalpinx, or extra-uterine gestation. The uterus becomes bound down in a

FIG. 106.



Successive accumulations of lymph between rectum and uterus
in pelvic peritonitis.

The patient is in the dorsal decubitus and the parts viewed from the right side, the intestines are pushed up out of the pelvis and the uterus is anteponated. The darker shading indicates the firmer constitution of the lymph exudation.

state of retro- or lateri-version, and if the former, the rectum may be narrowed. Owing to the passive congestion thus arising from the interference with the pelvic circulation, dysmenorrhœa (p. 68) and pelvic pain result. Occasionally a portion of bowel may be constricted so as to interfere with its mobility or produce acute strangulation. This may occur as a sequela to an exploratory incision or to the removal of an ovary and tube.

Should pregnancy take place, the uterus, as it increases in size and ascends, will necessarily tend to stretch the adhesions, producing pain, but ultimately causing relief. Often, however, these adhesions prevent the physiological ascent of the uterus, and abortion takes place. Peritonitic adhesions may doubtless become entirely absorbed in favourable cases, and especially after pregnancy.

Peritonitis may be acute or chronic, and may remain localised to the pelvis or become general.

(iii.) **Symptoms.**—*Acute Peritonitis.*—The severity of the symptoms does not seem proportional to the amount of the serous membrane involved; a very small patch, for instance, over the ovary or in its near vicinity, is capable of giving rise to most marked indications of the disease; while situated elsewhere, possibly very little discomfort, comparatively speaking, results from its presence. The disease may be ushered in by a rigor or a feeling of chilliness, and the three salient features are:

- (1) Pain;
- (2) Retching and vomiting;
- (3) Febrile symptoms.

Frequency of, and pain in micturition (dysuria) or pain during defecation (dyschezia) may result according to the situation of the disease.

The pain is usually situated on the affected side, often the left, and radiates over the lower hypogastrium and down one or both thighs; it is described as cutting, boring, or tearing in character, and has no rhythm in coming and going. It often comes on in paroxysms, especially at night, comparative freedom being enjoyed during the rest of the twenty-four hours.

The retching and vomiting may be a marked and constant symptom or only slightly prominent; the author inclines to the opinion that the more frequent the vomiting, the greater the danger, as the general peritoneum is becoming involved.

Febrile symptoms consist in an elevation of temperature (Fig. 107), sometimes considerable, a quick pulse not in proportion to this rise and increased rapidity of respiration, with headache, thirst, and dry skin.

Chronic Peritonitis results from a gradual formation of adhesions as the sequel of an acute attack, or from a series of such attacks, "recurrent peritonitis." The chief symptoms are:—

Backache, pain in the right or left iliac fossa, especially on exertion.

Leucorrhœa.

Dysmenorrhœa and menorrhagia, with liability to a fresh attack as the result of chill or any imprudence.

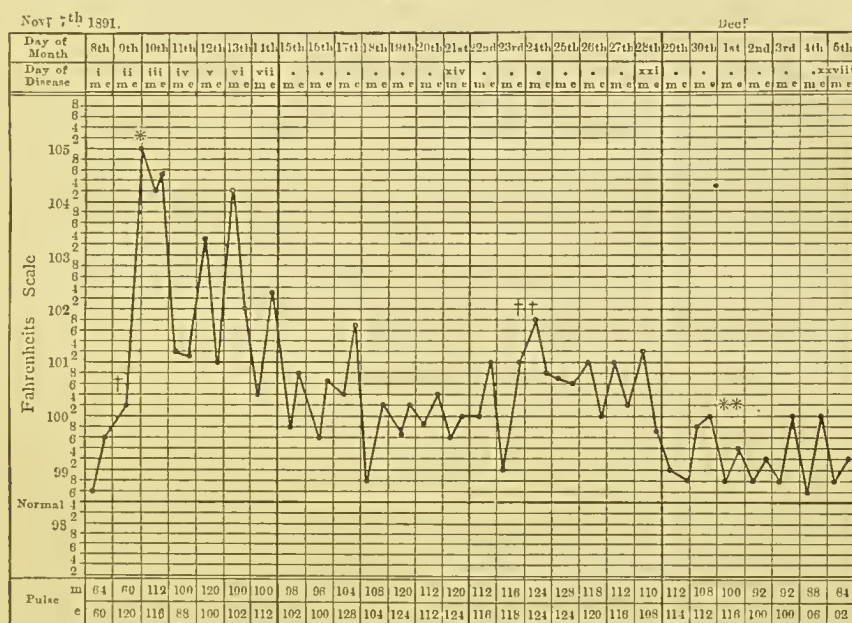
Dyspareunia and sterility; should pregnancy occur, there is

the danger of recurrence during the lying-in period, especially if sepsis supervenes.

General invalidism, hysteria and drink crave, &c., may result in these cases.

(iv.) **Physical Signs.**—*Acute Peritonitis.*—The face is anxious and pained, the eyebrows drawn towards each other, producing

FIG. 107.



Temperature chart from a case of acute pelvic peritonitis (perimetritis) after labour. Recovery. Uncontrollable vomiting during the whole pregnancy, and extreme emaciation. Patient delivered at term naturally.

† Lochia ceased.

* Feeling of chilliness, no rigor; abdomen tympanitic and tender; legs drawn up, rapid respirations; constant retching; delirium.

†† Relapse, with slight return of sickness and tympanitis.

** Per vaginam, uterus fixed; os uteri externum patent, os uteri internum closed; roof of vagina generally thickened, resistant and tender.

a frontal frown. The patient is found lying in the dorsal decubitus, with usually both thighs flexed on the abdomen and the legs on the thighs.

Per Hypogastrium.—The abdomen is observed swollen and not moving, or only slightly, with respiration: it is tympanitic and extremely tender on palpation. The muscles on one or both

sides may be rigid, resisting the pressure of the examining fingers. Bimanual examination is impossible. After three or four days, when exudation has taken place and the intestines have become bound together by adhesions, the indistinct sensation of a mass cropping up above the pelvic brim may be made out; resonance is, however, elicited over this tumour, which is due to distended and matted-together intestines.

Per Vaginem.—The mucous membrane is hot and dry, and the vessels in the posterior wall pulsate markedly; during the early stages of the disease nothing can be made out further, except perhaps slight tenderness in one of the fornices with pain on attempting to move the uterus. As lymph exudation takes place and adhesions are formed, the uterus becomes more or less fixed, and a bulging swelling (Fig. 106), can be detected in the posterior cul-de-sac due to a collection there of serous fluid (encysted peritonitis) or agglutinated intestines pushing the uterus forward; in other cases, the ovaries and uterus are felt fixed *in situ*, the roof of the vagina being hard and semi-elastic.

No albumen is found in the urine.

Chronic Peritonitis.—Absolute fixation of the uterus or diminished mobility; the uterus may be displaced in different ways by contraction of the adhesions, and the ovaries felt fixed and slightly prolapsed; the fornices, which in health have an arc-like contour with a soft and indefinitely resistant sensation, are rigid, flattened, thickened, and tender to the touch. In the posterior cul-de-sac may be felt the mass of exudation or the matted intestines already mentioned. Examination will usually give pain and be followed by pain, and often by elevation of temperature for a few hours.

(v.) **Differential Diagnosis** will be considered under the headings Pelvic Cellulitis and Pelvic Hæmatocele.

(vi.) **Treatment.**

- (a) Preventive;
- (β) Palliative;
- (γ) Operative;

A. *Acute Peritonitis*—(a) The preventive treatment is of the greatest importance, especially with regard to the exclusion of sepsis: during and after labour, abortion and miscarriage, all the antiseptic precautions laid down in text-books on midwifery should be rigidly followed both by nurse and medical attendant.

The treatment of gonorrhœa must be systematically carried out all through the pregnancy. The rules laid down with regard to the passage of the sound in Chapter ii. are to be observed.

When a woman is menstruating, all exposure to cold and unnecessary exertion should be avoided.

(β) Absolute rest in bed is an obvious necessity: a cradle to keep the weight of the clothes from the abdomen is useful; the *pain* is the symptom requiring the most immediate care, and the best method is to administer morphia with a small amount of atropin by means of a hypodermic syringe.

R	Morphinæ Hydrochlor.	.	.	.	.	.	gr. $\frac{1}{2}$
	Atropin. Sulph.	.	.	.	.	.	gr. $\frac{1}{100}$

In solution or tabloids.

This is the most scientific method; it does not upset the digestion, and the amount given can be accurately gauged: a morphia and belladonna suppository may be given per rectum or per vaginam instead, or as an adjunct. The application of three or four leeches to the iliac fossa in a robust patient is a justifiable mode of treatment.

Hot fomentations sprinkled with tinctura opii or spiritus terebinthinæ may be applied over the abdomen, and kept moist and warm by a piece of mackintosh; a light poultice, however, is preferred by some patients. Hot vaginal douches (temp. 110° – 120° Fahr.) every six hours, with decoctum papaveris (3j ad Oij) added, give great relief.

Retching and Vomiting is best relieved by sucking ice-pills, teaspoonful doses of iced champagne or brandy; an effervescing solution of hydrocyanic acid with bismuth is useful. Sipping hot water may be tried, a mustard leaf to the epigastrium or gentle pressure there, often succeeds.

Diet should be milk and soda-water in teaspoonful doses, with Valentine's meat juice or Brand's essence of beef, which must be given in small quantities and at regular intervals; brandy or champagne must be administered according to the pulse and temperature.

If the temperature rises above 103° and remains so for more than twenty-four hours, body-sponging with tepid or cold vinegar and water should be performed every six or eight hours, until a permanent reduction is produced: collapse may be occasioned by this treatment, and the pulse and temperature must therefore be carefully watched during the proceeding. Antipyrin gr. x with sp. ammon. aromat. 3ss may be given, and as the cases with high temperature are usually septic in nature, quinine in gr. v doses should be administered. Warburg's tincture may be resorted to, if given with all the precautions stated on each bottle.

It was formerly the practice to keep the bowels confined in

these cases; but as the disease is one not of the general but only of the pelvic peritoneum, and as the rectum is only involved in one small portion, it is desirable to keep the pelvic organs from becoming congested: it has been the author's practice to give a saline cathartic, like the hospital "white mixture," every morning; with a dose of calomel gr. j or ij in pill from time to time: an action of the bowels daily is desirable, otherwise the hard scybalæ which collect in the rectum give rise to great pain and discomfort with increase of fever by pressure in the neighbourhood of the inflamed surfaces. A glycerine or simple water enema will usually succeed, and if carefully given should produce no local disturbance.

(γ) *Operative Treatment*.—If pus is thought to be present, aspiration should be performed to verify the diagnosis, and an opening into the purulent collection by the vagina or by the abdomen, and drainage, must be resorted to, the after-treatment pursued being as in similar surgical cases: if a serous collection only exists, aspiration will be sufficient. As to opening the abdomen during acute peritonitis, much difference of opinion exists, but if there is a distinct cause discovered, such as rupture of a Fallopian pregnancy, bursting of a pyosalpinx, whether after labour or not, or if there is sufficient indication of septic fluid being present in the peritoneum, opening of the abdomen, antiseptic washing out and subsequent drainage of the peritoneal cavity is a justifiable, and indeed a proper, course to adopt.

(B) *Chronic Peritonitis*.—The adhesions in these cases rarely become entirely absorbed, hence there is permanent interference with the circulation and displacements of the uterus and ovaries have frequently to be dealt with. Continual pain, worse on walking or during menstruation, are the chief indications for treatment, which may be divided into:

1. Means for absorption of the adhesions;
2. Operative.

1. Application of lin. iodi and lin. belladonnæ over the abdomen regularly every night; hot vaginal douches at 110°–120° F. night and morning; and painting the vaginal fornices every three or four days with lin. iodi through a speculum, are all useful remedies. As the majority of these cases are in a low state of health and the circulation languid, anything which will improve these conditions will tend to cure the patient; tonics and abdominal massage are therefore of the greatest use. Electricity has not been found of much value. These measures must be continued over a long series of weeks or months, and a visit made to Kreuznach or Schwalbach before resort is made to:

2. *Operative measures*. Opening the abdomen and freeing the uterus, ovaries and tubes from their adhesions, is often followed

by the greatest relief. Should a pyosalpinx or ovarian swelling complicate them, its removal should be practised.

II. PELVIC CELLULITIS, OR PARAMETRITIS.

This is an acute or chronic inflammation of, with exudation into, the pelvic cellular tissue; it is nearly always complicated by a slight amount of pelvic peritonitis (perimetritis).

(i.) **Causation.**—Septic absorption through the lymphatics from some laceration or injury of the uterine body, cervix, vaginal roof, or even perineum. This condition is most commonly the result of labour, premature confinement, or miscarriage; primiparæ, in whom the cervix, the perineum, and vagina are usually torn to a greater or less degree, are particularly liable to it.

The passage of a dirty sound roughly over the endometrium, produces an abrasion through which septic absorption may take place.

Most of the conditions leading to pelvic peritonitis should be considered as causes of cellulitis.

The operation of supra-vaginal amputation of the cervix, when the incisions are made freely into the cellular tissue, may be followed by cellulitis, if sepsis occurs.

(ii.) **Pathology.**—The parts of the pelvic cellular tissue usually affected are:

1. The broad ligaments;
2. The utero-sacral ligaments.

The tissue immediately behind the uterus and that between the uterus and bladder are less commonly involved.

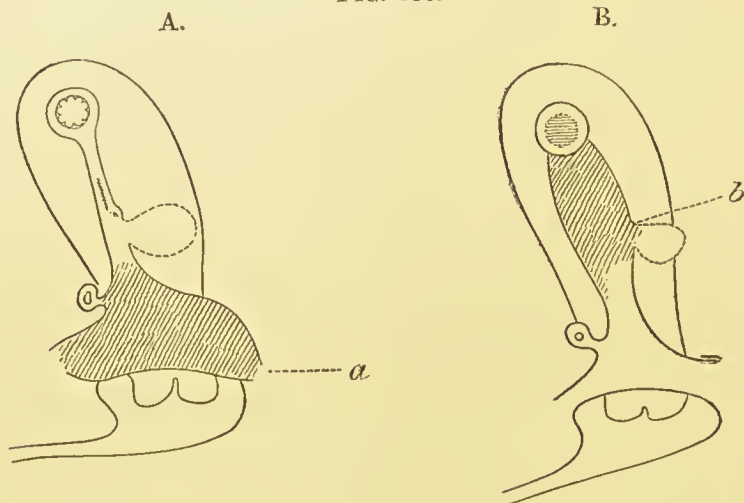
1. Exudation into the broad ligaments may take place in two positions. First, into the upper portion immediately below the Fallopian tube, and extending down to the level of the insertion of the hilum of the ovary (Fig. 108, B). Second, into the base: this is somewhat triangular in section, as is seen in Fig. 108, A. It may extend by a vital process, (1) to the iliac fossæ, the sides of the pelvis, or even up to the kidneys; (2) on to the anterior abdominal wall; (3) along the cellular tissue of the round ligament into the inguinal canal, and so to either labium. The posterior wall of the broad ligament usually bulges backwards towards the rectum in cases of a large amount of exudation; a mass may often be found connected and continuous, with a laceration of the cervix, more especially if this be deep and extend to the roof of the vagina.

2. The utero-sacral ligaments consist of folds of peritoneum, containing cellular tissue, and plain muscular fibres within them; if these become infiltrated, the subsequent cicatrization and contraction will cause dragging upon the junction of the cervix and body

of the uterus, and produce one form of acquired "antelexion," with its attendant symptoms, sterility and dysmenorrhœa (Fig. 85).

Opportunities of examination of the pelvis post-mortem in this disease are rare. A case observed by the author of exudation into the base of the *right* broad ligament presented the following features:—The uterus was pushed over to the left side, the Fallopian tube and upper part of the broad ligament were mobile and healthy, but the lower portion, from the ovary above to the

FIG. 108.



A. Pelvic cellulitis—Parametritis.

Left broad ligament seen from left side.

A mass of exudation (*a*), triangular in section and occupying only the base of the broad ligament ("basic" variety). From a fatal case of septicæmia; death from septic pneumonia. (Outline drawing from nature.)

B. Pelvic cellulitis—Parametritis.

Left broad ligament seen from side.

The base of ligament quite healthy; in upper part œdematous swelling (*b*) pushing ovary backwards. Tube full of pus. From a case of gonorrhœal pyosalpinx, abdominal section. (Outline drawing from nature.)

vaginal roof below, and from the uterus on its inner side to the pelvic wall on the outer, was occupied by a hardish, doughy swelling, which pushed the layers of the ligament apart as much as $2\frac{1}{2}$ inches, the posterior lamina especially projecting backwards; it was fixed in the pelvis, the ovary being attached to the upper part of the affected lamina and not freely mobile; the peritoneum was slightly opaque, but no fluid was present; on removing the pelvic organs, the upper part of the broad ligament was found translucent as in health, but the lower part was opaque, and

retained even when suspended its wedge-shaped form : on cutting into the mass it was found to be of a pinkish colour, with a rough granular surface ; small vacuoles were distributed over it, each containing an opalescent jelly-like material ; blood-vessels cut across were seen at intervals. A deep laceration of the right side of the cervix up to the roof of the vagina, and involving its mucous membrane, was found directly in communication with the exudation. The round ligament was fixed in the cellular tissue behind the anterior lamina of the broad ligament. The exudation extended on to the iliacus and psoas muscles.

It is shown by experience that the ovaries may sometimes contain abscess cavities, or become atrophied from pressure.

(iii.) Symptoms.

1. A rigor ;
2. Pain on the affected side ;
3. Febrile symptoms ; and
4. Pressure symptoms.

The onset of the rigor may take place twenty-four or more hours after labour, or the passage of a sound ; the temperature ascends rapidly, the skin being hot and dry. The pain is usually on the affected side and down the corresponding leg ; it is partly due to the accompanying peritonitis and to the pressure of the exudation upon the branches of the sacral plexus. The pain often comes on in paroxysms, and is worse at night. As the exudation becomes formed, the presence of a large mass in the pelvis will produce certain pressure symptoms ; the action of the bladder, uterus, or rectum may be thus interfered with.

The temperature gradually descends, there being an evening rise and a greater morning descent each twenty-four hours. Should fresh deposit take place, an elevation occurs somewhat similar to that observed in a relapse in typhoid fever. Suppuration is indicated by sweats and hectic temperature, accompanied by certain physical signs presently to be referred to.

Vomiting is much less frequent than in pelvic peritonitis.

The patient will generally lie in the dorsal decubitus, with one or both legs drawn up. The abdomen tympanitic and tender, especially on the affected side ; there may be œdema of the vaginal mucous membrane. If the urine be examined, it will be found very frequently to contain albumen.

(iv.) **Physical Signs.**—(a) If the mass of exudation occupies the base of either or both broad ligaments, a hard lump will be felt in the roof of the vagina of the corresponding side, the fornix being flattened out, giving the idea to the finger that the cervix is obliterated on that side. This swelling, according to its size, may occupy the entire half of the pelvis and extend into the

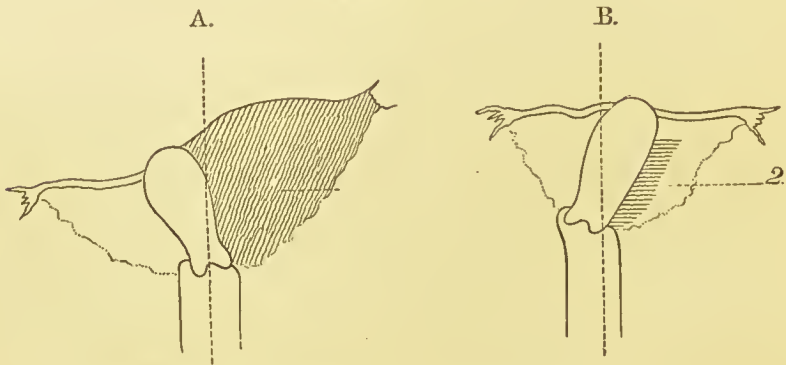
posterior cul-de-sac. The uterus is fixed and ponated or verted over to the opposite side (lateri-ponation or lateri-version) (*vide* Fig. 109, A).

(β) If the upper part of the broad ligament only is involved, nothing will be felt per vaginam; but by the hypogastrium, if the tympanitic abdomen permit of it, a swelling can be made out cropping up above the brim of the pelvis (Fig. 108, B).

(γ) If the whole of the broad ligament is invaded by the exudation, we get a combination of the two conditions above, (α) and (β).

Should suppuration ensue, the lump felt per vaginam or per hypogastrium, presents a softened spot to the examining finger,

FIG. 109.



Exudation into left broad ligament (seen from front).

- A. 1. Mass extending up into abdomen, obliterating left vaginal fornix and pushing uterus over to right side (lateri-version).
 B. 2. The same broad ligament eight weeks later, cicatrisation has drawn uterus over to left side.

From a case of pelvic cellulitis after abortion. (Semi-diagrammatic.)

with surrounding œdema. This is the site at which pus is probably presenting.

(v.) **Progress of the Exudation of Pelvic Parametritis.**—

(α) It may become entirely absorbed and without cicatrisation, the uterus returning to its normal position and regaining its mobility.

(β) Absorption may occur with a certain amount of cicatrisation; the uterus is therefore drawn over *towards* the affected side, and is somewhat fixed (lateri-verted) (Fig. 109, B).

(γ) Suppuration may take place and the pus find its way out through certain channels, or be let out artificially by an incision in the lower abdomen or vaginal roof.

The pus may find its exit by a mechanical process, externally or

internally. In the former, it may point over Poupart's ligament, or at the femoral opening, or passing through the sciatic notch appear on the buttock; occasionally it passes through the obturator foramen to the inner surface of the thigh. We have then a "remote" parametric abscess. The pus may be healthy and sweet, sometimes containing lumps of lymph and blood-clot, or may be extremely offensive, especially if the abscess is situated near the rectum.

An abscess may burst internally into the:

- (i.) Vagina (the most common and favourable course);
- (ii.) Rectum, when sepsis is very liable to arise;
- (iii.) Bladder, cystitis resulting;
- (iv.) Peritoneum most rarely: because the adhesions which are formed by the peritoneum as the abscess increases, shut off the cavity; if rupture takes place fatal peritonitis results.

A combination of external and internal rupture is not infrequent.

(8) Gangrene: this consists of sloughing of the parts contained in the broad ligament; it only occurs in the most acute forms, and is extremely rare.

Treatment.

1. Palliative;
2. Operative.

1. *Palliative*.—In the acute stage, all that has been recommended for acute pelvic peritonitis (p. 192) can be carried out with advantage.

The object after the acute stage is over is to prevent suppuration as far as possible by absolute rest; the motions and urine should all be passed lying down, and not until the temperature has been normal night and morning for a week should the patient be allowed up. For the purpose of absorption in the chronic form, hot douches night and morning, followed by tampons, saturated in solution of iodide of potash in glycerine, gr. xxx ad ʒj, have a good effect. If there is much pain, a rectal suppository may be administered as follows:

R Iodoformi	.	.	.	.	.	.	.	gr. v
Extr. Conii	.	.	.	.	.	.	.	gr. ij
Morphinæ Sulph.	.	.	.	.	.	.	.	gr. ʒ

Omni nocte.

2. *Operative*.—Much depends upon the situation of the "pointing" of the abscess; if at the abdominal wall, an incision should be made over it, and a glass drainage-tube inserted; if the pus be offensive, the cavity should be washed out with an anti-

septic solution of 1 in 4000 perchloride of mercury or boracic acid lotion.

The cavity is often broken up into secondary ones by lymph bands; if they present any hindrance to drainage, they should be broken down by insertion of the hand. If the abscess is bulging into the posterior cul-de-sac of the vagina, the site of proposed opening should be exposed with a Sims's speculum, and an incision with a Paquelin's cautery or scalpel made and a drain-tube inserted; rigid antiseptic precautions must be observed.

When the abscess opens into the bladder, and the opening is in the most dependent part of the abscess cavity, cure results with time as a rule; but if the situation of the aperture does not allow of complete drainage, convalescence is very prolonged, as the pus accumulates, the overflow only passing into the bladder and escaping with the urine; in such a case a counter-opening into the abscess-cavity from the vagina may be necessary. The same rules should be observed with regard to rupture of an abscess into the rectum. The patient's strength must naturally be supported through prolonged suppuration by means of easily digested and nutritious diet; a quinine and iron mixture is an excellent tonic. A change to the seaside often promotes healing.

III. PELVIC HÆMATOCELE.

By this term we mean an effusion or pouring out of blood into the pelvis. This accident may take place within the peritoneal cavity, when the name (*a*) **Intra-peritoneal hæmatocele** is given to it; or it may occur outside that membrane, into the cellular tissue around the uterus, or between the layers of the broad ligaments; this variety is called (*β*) **Extra- or Sub-peritoneal hæmatocele**. The hæmatocele is, however, only a secondary effect of some other cause or causes.

(i.) **Causation.**—Both varieties may arise from similar causes, and they will therefore be considered here together.

(1) *Predisposing.*—A certain liability exists in the parous as opposed to the nulliparous woman; the most favourable age appears to be from twenty-five to forty—i.e., the period of highest sexual activity; the presence of menstruation.

The hæmorrhagic diathesis, purpura hæmorrhagica, hæmophilia. Any degenerative condition of the vascular walls, or chronic over-distension causing a laxity of their tissues, as in passive congestion.

(2) *Direct or Exciting:*

(a) Rupture of an extra-uterine gestation sac is without doubt the most fertile cause (granting that the Fallopian tube is the

seat of the abnormal pregnancy): a glance at the diagram will indicate the two chief positions in which laceration takes place (Fig. 113). A section of the left broad ligament is shown viewed from the corresponding side. If the tube ruptures in direction of arrow *a*—*i.e.*, in the part uncovered by peritoneum—we shall get a hæmorrhage between the layers of the broad ligament, or an extra-peritoneal hæmatocele; if in the direction of the arrows *b*, *b'*, *b''*, we have hæmorrhage into the peritoneal cavity, or intra-peritoneal hæmatocele: an *interstitial* tubal pregnancy always ruptures into the peritoneal cavity.

(*b*) Rupture of the veins of the pampiniform plexus (Chap. i. p. 26) or varicose veins of the broad ligament during the engorgement present during menstruation, which might be due to shock, over-exertion, coitus, or chill during that time: rupture of a pelvic arterial aneurism very rarely.

(*c*) As a sequel to dilatation of the uterine cavity by Hegar's bougies; too early movement after the operation may bring it about.

(*d*) Ruptures of the uterus *with* the peritoneum covering it, or of an over-congested Graafian follicle, will produce an intra-peritoneal hæmatocele: if the peritoneum, however, remains intact in the former case, an extra-peritoneal effusion will result.

(*e*) Torsion of an ovarian pedicle leads to intra-peritoneal and intra-cystic blood effusion; after every ovariectomy, in which many adhesions have been broken down, or the pedicle ligature has slipped, an intra-peritoneal hæmatocele will be produced.

(*f*) Owing to undue patency of the Fallopian tubes, a regurgitation of blood from the uterus may take place into the peritoneal cavity.

(ii.) **Pathology.**—(*a*) Of *Intra-peritoneal hæmatocele*: this is much the more dangerous variety. If the hæmorrhage is slight, it gravitates into Douglas's pouch, and becomes absorbed by the peritoneum, leaving probably no trace, or only slight adhesions. If the amount is large, however, the shock produced on the peritoneum and the loss of blood may cause a rapidly fatal result; if not, and the patient survives, we have a large mass of fluid blood lying in the posterior cul-de-sac and posterior to the broad ligaments; it may even extend into the anterior cul-de-sac; the uterus is pressed downwards and forwards; the intestines float on the surface of this fluid, in which clotting takes place in about two to nine hours; but the shrinking, from fibrin contraction, which renders it a tangible mass, does not occur until the lapse of about forty-eight hours. In unfavourable cases, the irritation of the intestines sets up acute peritonitis and death may ensue. In more favourable instances, however, a local peritonitis is pro-

duced, and subsequently layers of adhesions, which serve to cut off the intestines above from the blood-clot below; we then have a form of encysted intra-peritoneal hæmatocele. There seems reason for believing that hæmorrhage may take place into a cavity already produced in this way by pre-existing perimetritis (pelvic peritonitis). Hence we have a first stage of hæmorrhage, and a second stage of pelvic inflammation. The subsequent course of events depends upon the behaviour of the encysted blood-clot: should this remain quiescent, we get absorption; but if it breaks down and suppurates we have a variety of pelvic abscess.

(β) Of *Extra-peritoneal Hæmatocele*.—Here the blood is poured out into the connective tissue between the layers of the broad ligaments and around the uterine cervix: it is necessarily limited in amount; the posterior layer of the broad ligament is usually pushed backwards, carrying the ovary with it, or the effusion may tend to pass downwards between the vaginal and rectal wall, simulating a hæmatoma of the vagina. If the tension is very great a secondary rupture may take place into the peritoneal cavity, and we then have a combined extra- and intra-peritoneal hæmatocele. A certain amount of localised pelvic peritonitis usually takes place. The blood-effusion becomes absorbed or suppurates as in cellulitis (pelvic parametritis).

(iii.) **Symptoms** are usually developed very suddenly and commence with pain and shock, followed by reaction and signs of inflammation.

Let us take the case of a woman who has been menstruating for twenty-four hours, and in whom there is a previous history of some pelvic disease: suddenly, and as the result of one of the above-mentioned causes, she is seized with more or less violent pain in the lower hypogastrium; all the signs of collapse, often accompanied by retching and vomiting, appear, and she may actually lose consciousness: the discharge, which was free, becomes scanty or ceases altogether, and the temperature is found to be subnormal, the pulse being very small and rapid; these symptoms would point to a blood-effusion of considerable amount into the pelvis. Death may ensue there and then; if not, and should the collapse pass off, pain of a stretching and tearing character will be felt, with a sensation as of something being poured out into the pelvis. Reaction will gradually set in, the temperature will rise, and the pulse although quick will become fuller; after the effusion has ceased, and if it be extra-peritoneal, the presence of such a mass will give rise to pressure symptoms, varying according to the site of the swelling; should general peritonitis supervene, which is especially likely in the intra-peritoneal variety, the usual symptoms of that disease will present themselves, but if

localised, those only of ordinary perimetritis. If the effused blood be gradually absorbed, the temperature and pulse will sink and convalescence ensue after the lapse of from three to six weeks. Should suppuration set in, the usual signs of acute pelvic abscess must be looked for. The collapse attending hæmorrhage into the peritoneal cavity is much more severe than that attending an extra-peritoneal effusion. The hæmorrhage due to ruptured tubal fœtation will be considered in Chap. xvi. p. 215.

(iv.) **Physical Signs.**—(a) *Intra-peritoneal hæmatocele* in the early stage—*i.e.*, before clotting takes place—gives rise to no marked physical signs either by hypogastrium or by vagina; distension of the abdomen takes place if the quantity effused be large, but as coagulation occurs, the mass made out per vaginam will be felt soft and yielding; the uterus will be found pushed forward and in the median line, the cervix close behind the symphysis pubis (anteponation), and the rectum will be pressed upon; later the abdomen becomes distended, tympanitic and tender. As pelvic inflammation sets in and layers of lymph are formed, the encysted portion is felt firmer and more elastic, and should it be very large, it can be palpated above the brim of the pelvis, although as a rule the great distension of the intestines obscures this sign until later; if small, it will not be detected. The uterus becomes fixed in its anteponated position, the retro-uterine swelling becomes more dense, and finally after some weeks disappears except for a thickening of the vaginal roof felt posteriorly; the uterus gradually returns to its normal situation, or may be displaced by the contraction of the resulting cicatricial bands.

There is great difficulty in diagnosis between this condition and perimetritis with effusion.

(β) *Extra-peritoneal hæmatocele*: in this variety the effusion is felt per vaginam as a more or less solid mass in one or both broad ligaments pushing the uterus to one side (lateri-ponation) and fixing it: if the tumour is large it may crop up above the pelvic brim. The physical signs of this condition are practically those produced by the exudation of pelvic cellulitis (parametritis).

(v.) **Differential Diagnosis.**

(a) *Intra-peritoneal.*

1. Perimetritis with encysted effusion into Douglas's pouch;
2. Subserous fibroid in the posterior uterine wall, incarcerated or not;
3. Prolapsed and adherent ovarian cyst;
4. Extra-uterine gestation (intra-peritoneal form of rupture);
5. Retroverted gravid uterus.

(β) *Extra-peritoneal.*

1. Parametritis;
2. Extra-uterine gestation (extra-peritoneal form of rupture).

The Points to be noted in differentiation of these conditions are :

1. The history of the case ;
2. The mobility or not of the uterus ;
3. Sudden or gradual mode of onset ;
4. The results of aspiration.

(vi.) **Treatment.**—1. During the stage of collapse, the question of the existence of a ruptured early extra-uterine pregnancy must always be considered ; if on vaginal examination not later than twelve hours after the attack, a tumour be found to one side or other of the pelvis, and if there be a history of amenorrhœa and other pregnancy signs, there is a strong presumption in favour of that diagnosis, and the treatment should be carried out as directed in Chap. xvi. A pelvic hæmatocele from blood only does not produce a definable tumour for at least forty-eight hours, because the clot is not sufficiently firm.

Excluding extra-uterine pregnancy, then, we must treat the patient by raising the foot of the bed and keeping the head low, ice should be applied to the vulva and hypogastrium, and as the patient cannot as a rule swallow, enemata of brandy and beef-tea given. An injection of two pints of a normal saline solution (a teaspoonful of common salt to a pint of boiled water) either intra-venous or per rectum, may be administered. Transfusion may be necessary as in post-partum hæmorrhage. Bandaging the legs from the feet up to the groins is a useful adjunct.

2. During the stage of reaction, pain may be relieved by morphia, sickness and other symptoms on the plan already laid down in the treatment of para and perimetritis. No operative interference should be sanctioned, except in the case of extra-uterine gestation : vaginal examinations should be made as seldom as possible ; if, however, the tumour is pushing its way downward between the rectum and vagina and tending to present at the vulval orifice, incision and drainage is permissible.

3. If resolution is taking place, nothing but absolute rest and careful general treatment is necessary : but if suspicion of suppuration arises, the aspirator should be plunged into the mass, with careful antiseptic precautions ; and if pus be withdrawn, a free incision, either in the hypogastrium or vaginal roof (according to circumstances) made, and the abscess cavity drained.

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CHAPTER XVI.

AFFECTIONS OF THE FALLOPIAN TUBES.

THE *function* of the tubes is twofold ; they act as ducts for the passage of the semen to the ovary and of the fertilised ovum back to the uterus. They are of extreme importance from a pathological point of view, as they may be the site of extra-uterine pregnancy, pyosalpinx or hæmatosalpinx, presently to be described.

(1) **Structural abnormalities** may be congenital or acquired ; if the former, they are of slight importance and consist chiefly in the presence of additional fimbriæ, or the development of one or more accessory ostia, which may or may not communicate with the normal tube. Undue patency of either tube may exist, and is of importance in connection with the administration of intra-uterine douches ; a sound can be passed in such cases, into the uterus and through the tube into the peritoneal cavity without any unnecessary force.

Acquired conditions are those of stricture or occlusion of the tube, which may be situated at the uterine or fimbriated end, rarely in the tube proper. Total occlusion of the fimbriated end is the most frequently met with, and is due to inflammatory attacks of peritonitis with the subsequent formation of adhesions. The lumen of the tube may be obstructed by some new growth or by kinking from external bands of lymph : the uterine end may become closed in consequence of an adherent placenta lying over the orifice, or by a new growth. Sarcoma not infrequently commences in this situation.

(2) Salpingitis, or Inflammation of the Fallopian Tubes.

(a) *Catarrhal Salpingitis* is a very common disorder in women ; and may result from a chill or imprudence during menstruation. It consists in a slight inflammation of the mucous membrane lining the tube ; as a consequence there is diminution of its calibre, mucous secretion collects, the tube increases in size, and the colour becomes a deeper pink than is normal. Under favour-

able conditions this all subsides, but is liable to recurrence. The symptoms accompanying this lesion are uncertain; probably they consist in nothing more than uneasiness on the affected side, with some dysmenorrhœa. If, however, recurrence is frequent, or if the inflammation be severe enough, the external ostium ceases to be patent owing to the formation of adhesions with the ovary, which is usually inflamed; the secretion from the mucous lining of the tube still continues, and as there is no free outlet, it collects and produces a retention cyst to which the name of *hydrosalpinx* is given; the contents as a rule are pale and watery or mucoid in character. As the fluid accumulates the walls become distended, thinned out, and semi-transparent, while the mucous membrane undergoes atrophy: if the parts be viewed *in situ*, the distended tube will be seen to be of the shape of an arched pea-pod, with the ovary lying in its concavity. Salpingitis usually attacks both sides, and we may hence find a single or double hydrosalpinx present.

(β) *Salpingitis*, secondary to some lesion in another part of the genital canal, is a much graver and more important disease.

(i.) **Causation.**—1. An extension of gonorrhœal vaginitis into the uterus, producing gonorrhœal endometritis, thence infecting the mucous membrane of the tubes.

2. As the result of sepsis after labour or abortion, the septic poison extending into the tubes.

3. The passage of a dirty or infected sound into the uterine cavity.

4. Neglect of strict antiseptic precautions in the use of tents and in all intra-uterine operations.

5. Acute desquamative salpingitis following scarlatina.

6. Tubercle.

7. Actinomycosis.

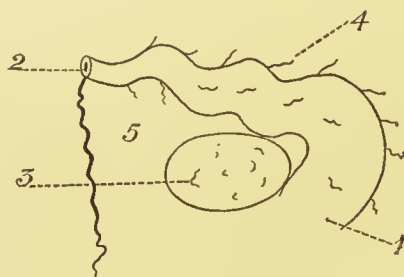
8. Syphilis (?).

(ii.) **Pathology.**—The disease having spread from the endometrium to the lining membrane of the salpinx, the pus may pass in acute cases on through the patent ostium to the peritoneum, and produce general peritonitis and death: this is probably the case in the puerperal variety, but rarely in the gonorrhœal in which the serous inflammation is limited. In the more chronic form, a local peritonitis takes place at the fimbriated end, which results in closure of the ostium abdominale. The other tissues of the tube become involved, the fimbriæ swollen, the areolar and muscular coats hypertrophied, and the tube, instead of being its normal size of a goose-quill, becomes three or four times thicker. It also increases in length, and becomes tortuous from the peritonitic adhesions fixing it in various places. It

is of a deep claret colour, gives a nodular sensation to the touch, and if cut across, a drop of pus or muco-pus exudes on pressure. Recurrent attacks of peritonitis produce fresh adhesions, especially with the ovary, which if prolapsed into Douglas's pouch, becomes fixed there; increased tortuosity of the tube results with further binding down and matting together of the parts in the pelvis.

The uterine end of the tube is constricted, if not entirely closed, and we have therefore practically a sealed cavity containing muco-pus or pus: this increases in amount, producing distension of the tube, more particularly at its outer two-thirds, and an irregular abscess sac results, to which is given the name of *pyosalpinx*: (Fig. 110): it may take the form of a sausage-shaped swelling, with

FIG. 110.



Pyosalpinx from behind (right side). (Outline drawing from nature, after abdominal section.)

- | | |
|---|---|
| 1. Dilated and occluded fimbriated end with fimbriae obliterated. | 4. Adhesions over both tube and ovary. |
| 2. Uterine end, admitting a bristle. | 5. Thickened and oedematous broad ligament. |
| 3. Enlarged, adherent and chronically inflamed ovary. | |

constrictions running across it at intervals, the result of the peritonitic adhesions, the walls being much increased in thickness throughout or varying in different parts. Prolapse of the dilated tube into Douglas's pouch with fixation there is a frequent complication. On examining the interior of the tube, the longitudinal folds will be found effaced and the characters of the mucous membrane destroyed (Figs. 111, 112). Salpingitis rarely occurs alone, but is complicated by acute or chronic inflammation of the ovary, and the fimbriated end of the tube is adherent to the surface of that organ in consequence of the peritonitic attacks. The relation which hydro- and pyo-salpinx bear to each other is not yet clearly decided.

(γ) Should the external ostium become closed and hæmorrhage take place into the cavity of the tube, we get a collection of blood

in that situation : to this condition the name *hæmatosalpinx* is given.

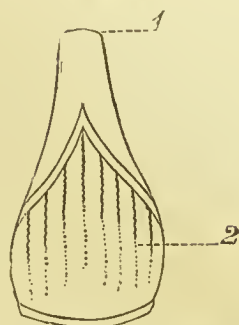
This may occur under the following conditions :

1. Normal hæmorrhagic discharge from the mucous membrane of the Fallopian tube ;
2. Hæmorrhage into a pre-existing hydro- or pyosalpinx ;
3. As a consequence of the rupture of a tubal pregnancy ; or
4. Of torsion of the pedicle of an ovarian cyst.

If the ostium externum remains patent, regurgitation of menstrual blood through an abnormally patulous uterine opening may occur, but this is not a true hæmatosalpinx.

(iii.) **Symptoms.**—Excluding tubal gestation, it is very difficult

FIG. 111.

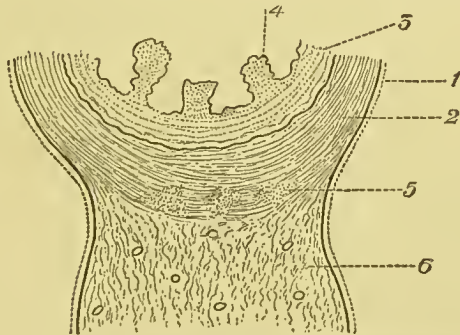


Left pyosalpinx from same patient as Fig. 110.

The tube is laid open to show the ridges of mucous membrane (2) almost obliterated.

1. Uterine end of tube.
(From nature.)

FIG. 112.



Transverse section of uterine end of a small pyosalpinx (right side) showing the partial loss of lining membrane.

(Microscopical section slightly magnified.)

- | | |
|---|---|
| 1. Peritoneal covering. | 5. Section of longitudinal muscular bundle. |
| 2. Circular muscular layer. | 6. Thickened and oedematous mesosalpinx. |
| 3. Submucous layer. | |
| 4. Remains of longitudinal ridges, the ciliated and cubical epithelium destroyed. | |

to estimate what symptoms are associated with, or are due to, hydro-, pyo-, or hæmatosalpinx. It must be remembered that

acute or chronic ovaritis is usually also present, and it is manifestly impossible to eliminate this condition from the question at issue. Dysmenorrhœa, menorrhagia, dyspareunia, and sterility occur as a rule. Pain, worse on movement and in defecation, is usually present. There may be slight evening fever, especially in pyosalpinx, but this is a disputed point. Hydrosalpinx probably gives rise to no symptoms.

(iv.) **Physical Signs.**—Beyond tenderness on deep pressure, in one or both iliac fossæ, nothing can be made out by examination per hypogastrium. By the vagina, the uterus is not freely mobile, or may be quite fixed. An extremely tender, elongated, and immobile swelling is felt in the posterior cul-de-sac or in one or other posterior quarters of the pelvis; the ovary may be made out enlarged and tender; a rectal examination will confirm these conditions. If, in addition, the history of either a labour, or miscarriage followed by sepsis, or gonorrhœa, can be elicited, the presence of a dilated tube may be fairly surmised; as to the contents of the tumour, there is no certain means of ascertaining them, except by puncture with a trochar, which is a proceeding not unaccompanied by serious risk to the patient. Full anæsthesia is usually necessary to make out the physical signs satisfactorily.

(v.) **Treatment.**—In simple catarrhal salpingitis, sexual and physical rest, hot vaginal douches, and saline purgation, with counter-irritation to the abdomen, will usually effect a cure. French authorities are of opinion that a good result is more likely to be brought about by attacking the diseased endometrium: they therefore resort freely to scraping the uterine interior with a sharp curette. There seems little doubt but that this mode of procedure often aggravates the already existing tubal disease, and for this reason should not be undertaken.

With a dilated tube, treatment much depends upon the symptoms produced by its presence; if the existence of pus is fairly made out, the sooner the tube and ovary on one or both sides are removed the better: this is best performed by opening the abdomen, ligaturing the broad ligaments and cutting away the diseased parts. Removal or puncture by the vagina is a very hazardous proceeding.

In many cases a dilated tube may exist, especially a hydrosalpinx, for a considerable time and give rise to no symptoms: no operation is then justifiable. Often merely separating the adherent tubes and ovaries by breaking down the bands of lymph after opening the abdomen, suffices to give entire and permanent relief.

In recommending such an operation as removal of the tubes and ovaries, we must consider whether the sufferings of the patient

are sufficient to warrant the performance of such a dangerous operation: we must remember that while on the one hand, if left alone, rupture into the peritoneal cavity may occasionally take place, or that the patient may live many years a miserable and painful existence, on the other she may die from the operation, or as a consequence of the unsexing which it produces, become the subject of various neuroses and be left in a worse position than before. The patient and her husband should have the risks and possible results of the operation fully placed before them.

(3) Tubal, Ectopic, or Extra-uterine Gestation.

By either of the above terms is indicated the fixing and subsequent development of a fertilised ovum *outside* the uterine cavity.

The majority of ectopic pregnancies, if not all, are *primarily* tubal—that is, they arise from the arrest, in the tube, of the impregnated ovum.

(i.) **Causation.**—1. One or more attacks of acute desquamative salpingitis: as a result of this disease, there is a loss of the ciliated epithelium of the tubal lining membrane, and hence the passage of the ovum into the uterus is interfered with, and probably that of the semen into the tube facilitated.

2. The presence of peritonitic adhesions partially occluding the lumen of the tube and distorting its course; these result from salpingitis, followed by localised peritonitis.

Ectopic gestation usually occurs in women who have been sterile for several years, or who have not borne children for a considerable time; age appears to have no definite influence on its production; the accident may happen twice in the same patient, and simultaneously in both tubes, while it may exist as a complication of a normal intra-uterine pregnancy.

(ii.) **Pathology.**—Tubal gestation may be situated in any part of the tube, viz.:

(a) In the intra-uterine portion, when the term “interstitial” is applied to it;

(β) In the tube proper, and

(γ) At the fimbriated end: the gestation sac being completed by the attachment of the fimbriae to the ovary or to some of the viscera.

The *course* followed by an extra-uterine gestation and the accompanying pathological changes are best considered under three heads:

1. Those occurring up to the time of rupture of the “gestation sac”;

2. Those following the rupture;
3. The concurrent behaviour of the uterus.

1. During the first six weeks of the pregnancy there is considerable turgidity of the mucous membrane at the site of the arrested ovum; this apparent thickening of the walls of the tube is not due to muscular hypertrophy. Towards the end of the eighth week, the abdominal ostium becomes closed. The ovum meanwhile develops a chorion and progresses as in normal pregnancy, but is not firmly attached to the wall of the tube; as it increases in size the walls become thinned out and the longitudinal ridges disappear. The chorionic villi atrophy, except at the site of the villous mass which represents the placenta. Apoplexy of the ovum may be produced as a consequence of hæmorrhage taking place into its cavity: this has been termed a "*tubal mole*," and may be classed as one form of hæmatosalpinx. This blood-mass may remain quiescent in the tube, or if the ostium externum remain patent, be expelled into the peritoneal cavity, producing a "*tubal abortion*."

As the ovum increases in size, rupture of the Fallopian tube in the majority of cases must at last take place; if the pregnancy is of the interstitial variety, rupture is almost inevitably into the peritoneal cavity; although cases have been reported where the ovum is *said* to have passed into the uterus and thence to have been expelled as an ordinary miscarriage. Laceration of a true tubal pregnancy usually occurs about the twelfth week, never later than the fourteenth.

2. *Rupture* of a true tubal gestation may occur:

- (a) Into the peritoneal cavity, or "*intra-peritoneal*" rupture;
- (β) Between the layers of the broad ligament, or "*extra-peritoneal*" rupture.

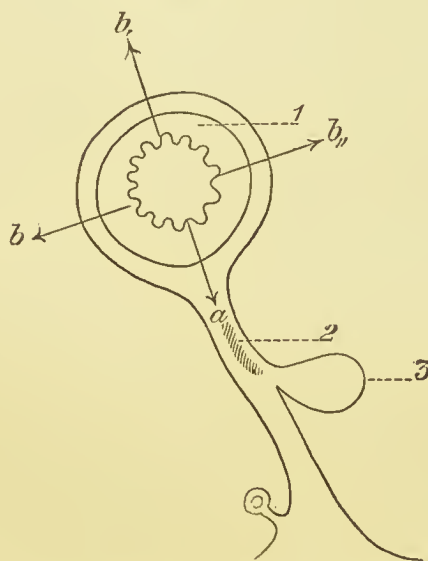
A reference to Fig. 113 will explain these two processes. It will be found that when the ovum is situated in the outer third of the tube, intra-peritoneal rupture is usual, while in the middle third it is extra-peritoneal as a rule, owing to the separation of the layers of the broad ligament (mesosalpinx) being more marked in this latter situation.

(a) Intra-peritoneal rupture produces the *secondary abdominal* form of extra-uterine gestation: if death does not occur from shock, a cyst is formed by layers of lymph, the product of the irritated peritonæum, and the fœtus and placenta go on growing in their adventitious sac: the placenta is usually formed of several lobes which become intimately attached to various viscera, especially the intestines and rectum. The child may die and remain quiescent for a long period, rarely it undergoes putrefac-

tion and a suppurating cavity is produced, or it may be removed by abdominal section in consequence of certain irritative symptoms arising.

(β) If a foetus passes into the space between the layers of the mesosalpinx or broad ligament, the placenta may attach itself to the base or the apex of the cavity. In the latter case, as the tumour increases it will be found rising with it into the abdominal cavity; being subject to constant change of position, severe hæmorrhages may consequently occur. The child may grow to

FIG. 113.



Section of broad ligament on left side, with Fallopian pregnancy, viewed from patient's left side. (Diagrammatic.)

1. Thickened mucous membrane of tube.
2. Parovarium.
3. Ovary.

The arrows denote the possible sites of rupture of the tube.

- a. Intra-ligamentous or extra-peritoneal rupture.
- b b' b''. Intra-peritoneal ruptures.

term and remain as before, producing no untoward symptoms; it may die, and the sac contents suppurate, the bones and pus making their exit by the rectum, vagina or bladder; or abdominal section may be necessary. It is stated that a secondary rupture of this sac into the peritoneal cavity occasionally occurs (secondary intra-peritoneal rupture).

3. *The Concurrent Behaviour of the Uterus.*—This organ undergoes a certain amount of sympathetic enlargement, the walls becoming thickened and the cavity lengthened and enlarged

The mucous membrane develops into a decidua, which is either shed at the spurious labour which occurs in these cases, or comes away in the shreddy hæmorrhagic discharge, which is often an important symptom. The cervix is softened as a rule. Rhythmic and painless contractions of the uterus can be felt as in a normal pregnancy.

(iii.) **Symptoms and Diagnosis.**—(1) Before rupture of the gestation sac. Symptoms are usually obscure; amenorrhœa, sickness and mammary changes may be present as in normal pregnancy, and nothing may arise to attract the attention of the patient to her condition. Occasionally a hæmorrhagic discharge comes on, containing shreds of decidual membrane and pain of a colicky nature may occur on the affected side. If on examination of a patient with these symptoms, an enlarged uterus and a rounded swelling on either side of and slightly posterior to it, are found, a very grave suspicion of the existence of an ectopic pregnancy should be entertained.

(2) The symptoms of rupture of the sac are usually sudden and excruciating abdominal pain, followed by collapse. They come on in some cases without any cause, in others there is a history of sudden or violent exertion, prolonged retention of urine, straining at stool, coitus, and the like. All the signs of shock are present, such as extreme pallor, cold sweat, and thready pulse. The patient will be found lying on her back, with the knees drawn up, the abdomen very tender, and her face expressive of great suffering; the hæmorrhage from the lacerated tube may be so excessive that death may take place almost immediately, or she may rally, and subsequently die from acute peritonitis, if the rupture be intra-peritoneal.

(3) The symptoms after rupture depend upon whether the fœtus has escaped into the peritoneal cavity or between the layers of the broad ligament. If the former, after the inflammatory attack of peritonitis has subsided, the patient suffers from irregular but severe abdominal pain, and the hæmorrhagic discharge continues. The child and placenta meanwhile are growing, and fœtal movements may be felt by the mother, and the heart sounds detected by the observer. About the time pregnancy should terminate, a kind of spurious labour comes on, and a decidual membrane is passed; the breasts swell, and again become flaccid in two or three days' time. The child then dies, and may produce in rare instances no symptoms, simply causing discomfort by its mechanical presence, undergoing finally a change into "adipocœre." Symptoms of irritation may arise, necessitating its removal by abdominal section, or putrefactive changes set in, and suppuration take place in the sac. If this is opened and the contents removed

recovery usually takes place ; if, however, the case is left to nature, the pus and bones find an exit as already described after a prolonged illness ; the patient, however, usually succumbs from exhaustion before this process is completed.

If the fœtus lies between the layers of the broad ligament, such severe hæmorrhage as in the former variety does not occur ; symptoms and signs almost exactly simulating an extra-peritoneal hæmatocele arise (p. 200). The subsequent course of the case may be as before, although suppuration is relatively more common.

Primary Abdominal Pregnancy.—The possibility of the existence of this condition is insisted upon by some authorities. The fertilised ovum is shed into the peritoneal cavity and develops there at the expense of various viscera, following a similar course to secondary abdominal pregnancy. Experiments on animals seem, however, to show that the absorptive powers of the peritoneum would not permit of the survival of such a small and delicate organism as a recently impregnated ovum.

(iv.) **Differential Diagnosis.**—During the *early* stages of pregnancy, an extra-uterine fœtation should be distinguished from :

1. Hydrosalpinx ;
2. Pyosalpinx ;
3. Small ovarian cyst ;
4. Pediculated subserous fibroid ;
5. Fibroid in the posterior uterine wall.

During the *later* stages, it may be simulated by :

1. An ovarian cyst ;
2. Encysted perimetritis ;
3. Intra-uterine gestation ;
4. Gestation in one cornu of a two-horned uterus ;
5. Fibro-cystic tumour of the uterus ;
6. Cyst of the broad ligament.
7. Retro-verted or -flexed and incarcerated pregnant uterus.

(v.) **Treatment** may be considered under three divisions, and according to whether rupture has taken place or not.

(a) Treatment before rupture of the gestation sac has occurred ;

(β) At the time of the rupture ;

(γ) Subsequent to the rupture.

(a) If a certain diagnosis can be made, many advocate attempting to destroy the vitality of the fœtus by various means ; these consist in passing a fine trocar per vaginam into the sac and drawing off the liquor amnii ; in the injection of a solution of morphia hydrochlorate gr. $\frac{1}{2}$ every other day into the sac, or by the passage of the Faradic current, one pole being placed in the vagina, the

other on the abdomen. It seems better, however, that too prolonged a trial should not be given to these methods; the more proper proceeding would seem to be to open the abdomen, ligature the tube with its contents and remove it. This has been done designedly, with success, in one case only. Cutting into the tumour *per vaginam* with a Paquelin's cautery and removing the fœtus and membranes through the opening, has also been advocated, but is a hazardous proceeding.

(β) At the time of rupture, if the patient is evidently dying of hæmorrhage from the laceration, treatment consists in opening the abdomen, clearing out the clots which collect in Douglas's pouch, and ligaturing the broad ligament and its contents, if possible removing them entire. Should there be, however, evident indications that the rupture is extra-peritoneal, waiting is advisable, and attention should rather be paid to combating the collapse by the transfusion of a saline solution, stimulation, and the like.

(γ) After the rupture, the fœtus with its placenta may grow until the spurious labour occurs. In deciding the time for operation, it has been proved by experience that extra-uterine children are always weakly and deformed, hence the mother's safety should be alone considered. The abdomen should be opened and the fœtus removed; the placenta is better left alone; any attempt to dislodge it from its various attachments will only lead to serious and even fatal hæmorrhage. The cord should be tied close to its attachment and the abdomen closed in the hope that the placenta will either be absorbed or become encysted. If sepsis arises from its decomposition, secondary laparotomy is necessary for its removal.

Exceptions to the above rule occur—

- 1st, when the child has been dead for some time;
- 2nd, where suppuration has taken place;
- 3rd, when the placenta is above the fœtus.

In the first two, the placenta is found to be detached comparatively easily, and without hæmorrhage; it should therefore be removed. In the third, profuse hæmorrhage must necessarily occur because the fœtus cannot be reached without dislodging the placenta.

When putrefactive changes have taken place in the sac, the sooner it is opened by abdominal section the better; the contents should be evacuated, and the cavity irrigated with a 1 in 1000 perchloride of mercury solution, the edges of the sac-wall stitched to the abdominal incision, and a glass drainage-tube inserted. Contraction of the sac gradually takes place, and a cure results.

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CHAPTER XVII.

AFFECTIONS OF THE OVARIES.

1. **Congenital Abnormalities.**—If there is complete absence of both ovaries, which is a very rare condition, an imperfect development of the uterus is always co-existent, and if either ovary be absent, the corresponding half of the uterus is usually immature. There is considerable doubt as to whether a genuine case of third or supplementary ovary has ever occurred; the body mistaken for that organ being usually a fibro-myoma of the ovarian ligament.

Symptoms.—The physique of a woman with no ovaries tends to the masculine type: there are no breasts, and the nipples are small; the voice is low-pitched and rough; hair may be present on the face. Occasionally epileptic attacks, commencing at or about puberty, are associated with this condition. There is absolute amenorrhœa.

The absence of one ovary may produce no symptoms; dysmenorrhœa, which occasionally occurs, is probably due to the accompanying partially immature uterus.

2. **Displacements.**—(a) Hernia; (β) Prolapse.

(a) *Hernia* of the ovary is nearly always congenital; a few cases of the acquired form have been recorded. The ovary follows in the course of an inguinal hernia and presents at the external abdominal ring, rarely at the obturator foramen.

Symptoms.—Any that arise are due to its exposed position; pressure upon it produces sickening pain; an increase in size has been observed up to the onset of menstruation.

Treatment consists in adapting a protective pad, attached to a truss. If the pain and inconvenience become intolerable, it is justifiable to remove it.

(β) *Prolapse.*—The normal position of the ovary and its mode of retention must be recalled (Chapter i. p. 13). Alterations in position of the uterus and bladder change that of the ovary, within certain physiological limits. If, however, there is a tendency to displacement downwards and backwards, towards

Douglas's pouch, we get a partial or complete prolapse of the ovary.

(i.) **Pathology.**—The usual site of a prolapsed ovary is in the posterior cul-de-sac: when there, attacks of inflammation may occur, with the formation of peritonitic adhesions, which bind it down and fix it in its abnormal position: further congestion naturally results. The ovary upon the left side is most commonly displaced. In prolapsus uteri the ovaries follow the course of the hernia, while in uterine inversion they first lie in the cup of the inverted fundus, and subsequently retract from it.

(ii.) **Causation.**—(1) During pregnancy as the uterus rises into the abdomen, it carries the ovaries and tubes with it; if during the puerperium, proper involution of the ligaments (especially the infundibulo-pelvic of the Fallopian tube) does not take place, one or both ovaries, from loss of their support, may tend to prolapse, instead of remaining in their usual position at the pelvic brim.

(2) Retroflexion and retroversion of the uterus.

(3) An enlarged ovary tends by its own weight to descend; a blow or sudden movement may precipitate that action.

(iii.) **Symptoms** may be entirely absent; usually there are reflex nervous disturbances, such as vomiting and various neuralgias; there is pain in defecation or in sexual connection, this being of a sickening and very acute nature.

(iv.) **Physical Signs.**—On examination by the vagina the ovary is felt either of normal size or enlarged, mobile or fixed in the posterior cul-de-sac, and slightly to the right or left of the median line. In complete prolapse the ovary lies exactly in the median line, and it is impossible to say whether it is the right or left, except by verifying the position of the normal one; pain is elicited by touching it. A rectal examination enables the observer to feel the ovary more distinctly, and it should always be resorted to in these cases.

(v.) **Treatment.**—This varies according to whether the ovary is mobile or fixed. If mobile, the genu-pectoral position should be assumed for from four to six hours a day: hot vaginal douches twice daily, followed by the insertion of a glycerine pledget to support the ovary, are of the greatest value.

A saline purge every morning, or better, a visit to Schwalbach or Kreuznach, relieves the congestion to a marked extent.

A soft rubber ring pessary to support the ovary often gives considerable relief.

When the uterus is retroflexed and the ovaries fixed in a position of prolapse, there is no satisfactory treatment which can be adopted. Removal of the misplaced organ or freeing it from its

adhesions has in some instances proved useful, but an operation should not be resorted to without a prolonged trial of palliative measures.

3. Inflammations.—Inflammation of the ovary is termed ovaritis or oöphoritis, and may take an acute or chronic form.

(i.) **Pathology.**—These cases rarely end fatally, and hence post-mortem examinations are not frequent, and our knowledge is acquired in a great part from observation of ovaries removed by abdominal section.

(a) *Acute Ovaritis.*—In studying the structure of an ovary (Chap. i. p. 13) it was found to consist of a layer of altered peritoneum or germinal epithelium covering its surface, and chains of Graafian follicles lying in a connective-tissue stroma; each or all of these may become inflamed.

Peri-oöphoritis consists of a localised peritonitis around and over the surface of the ovary, and is usually the sequence of salpingitis; this leads to the formation of adhesions between it and the tube. The tissues immediately beneath the inflamed peritoneum are doubtless slightly affected also, as are the chains of follicles extending into the ovarian substance (*follicular oöphoritis*); in this condition the ovary is not markedly enlarged. In *interstitial oöphoritis* there is proliferation of the connective tissue of the stroma, which may follow an attack of pelvic parametritis (cellulitis) by extension from the broad ligaments. Suppuration sometimes results, more especially in septic puerperal cases, and the ovary becomes an abscess cavity, which may burst into the peritoneal cavity or one of the neighbouring viscera. In this variety there is usually distinct enlargement of the ovary.

(β) *Chronic Ovaritis* may occur as a sequela to the acute variety. It is found to take two forms; in the one the ovary is larger than usual, and occupied by a number of cysts, on cutting into which a clear or hæmorrhagic serous fluid is found; these are probably distended Graafian follicles (Fig. 114, A, B). In the other a cirrhotic condition has arisen; the ovary is smaller than usual, the surface is wrinkled and irregular in appearance, and indurated to the touch; the follicles have undergone varying stages of atrophy.

(ii.) **Causation.**—(a) Sepsis after labour, abortion, or operations on the uterus;

(β) Gonorrhœa, as a result of latent gonorrhœa in the male;

(γ) Scarletina and possibly other specific fevers;

(δ) Chill during the menstrual flow;

(ε) Sexual excess;

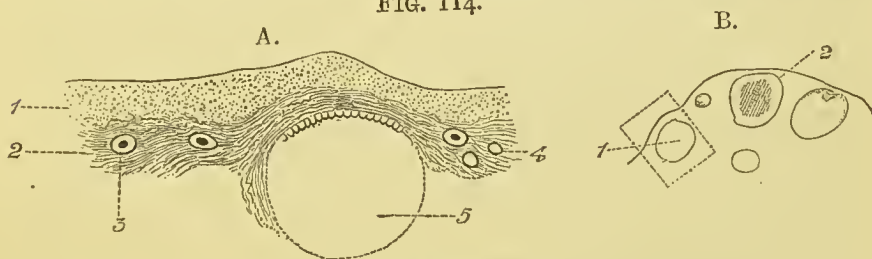
(ζ) Alcoholism.

(iii.) **Signs and Symptoms.**—As acute ovaritis hardly ever occurs alone, it is practically impossible to give the distinguishing

features to which it gives rise; they are those usually accompanying acute and localised pelvic peritonitis and cellulitis, but with more marked nervous disturbance. Locally the tenderness can be more distinctly mapped out.

In chronic ovaritis there is usually sterility and dysmenorrhœa, with profuse menstruation; if the ovary is prolapsed, there is pain in defecation and reflex urinary trouble. The constitutional symptoms are of the nervous type—hysterical attacks, inability to walk, reflex sickness and the like, the patient leading an invalid life. There is often pain in the iliac fossa on the affected side, which is increased on pressure; there may be a tender spot immediately below the left mamma and hysterical manifestations may be elicited

FIG. 114.



Chronic ovaritis.

A. Microscopical section of an ovary in a state of chronic inflammation with enlargement and cystic degeneration.

1. Tunica albuginea (thickened).
2. Ovarian stroma.
3. Graafian follicle.
4. Empty cavity, probably formerly occupied by a Graafian follicle.
5. Distended follicle with epithelial lining.

B. Part of same ovary, natural size.

1. Portion magnified in A.
2. Cyst filled with blood-stained fluid.

by touching either of these localities. By the vagina an extremely tender, semi-mobile swelling will be felt just behind either broad ligament; the mobility of this and of the uterus will depend upon the number of peritonitic adhesions present.

It is important in examining a patient with ovaritis to place her in the dorsal position and make her rotate the knees outwards; the effect of this is to put each psoas muscle on the stretch, the inner edge of this muscle being the guide to the ovary on either side. By bimanual palpation in this position an enlarged and tender ovary can be easily made out (*vide* p. 42).

A peculiarity of ovaritis is that it may attack the ovary on one side, and afterwards that of the other, the organ first implicated partially or completely recovering.

(iv.) **Treatment** of acute ovaritis is practically that of acute peritonitis and cellulitis, which has been given in detail (Chap xv. p. 192).

In chronic ovaritis a certain amount of local treatment is advisable, such as hot douches, glycerine pledgets, and counter-irritation; frequent vaginal examinations should, however, be avoided. Iron is best given as the ammonio-citrate, but is only useful where there is marked anæmia; as a rule it is not well borne. A mixture of potassium iodide and bromide is the usual prescription for these cases, and it is certainly very efficacious in many; opium should never be given.

Regularly administered and nourishing food is of the greatest importance, but alcohol is not necessary. Moral influence is the most powerful agent at our disposal, and often if a patient can be aroused from thinking of herself and her ailments, and be made to interest herself in some hobby, most of her symptoms will be ameliorated, or at any rate her suffering will be better borne.

Under certain conditions where the menstrual flow is profuse and evidently tending to produce anæmia, after all remedies have been tried, the removal of the ovaries to produce an artificial menopause may be considered, but should never be performed without entire approval by another authority.

4. **New Growths.**—New growths of the ovary may be considered under two headings, according as they are

(A) Solid; or (B) Cystic.

(A) Solid New Growths or Tumours of the Ovary.

These are usually of a malignant nature, and occur either in the form of sarcoma or carcinoma. In rare instances they are innocent, such as fibro-myoma.

Malignant disease of the ovary may arise primarily in the organ itself, or be secondary to some uterine or pelvic affection of a similar nature. Sarcoma, which is by far the most frequent variety, may be mistaken for a pediculated subserous uterine fibro-myoma, and it is only the *attendant symptoms* which arouse suspicion as to the nature of the former. These are:

1. A rapid increase in the size of the swelling, accompanied by much acute but localised pain;
2. Marked emaciation and a depreciation of the quality of the blood, this latter condition giving rise to œdema of the feet and legs;
3. The tumour forms adhesions with surrounding organs, resulting in its complete or semi-fixation: ascites is produced from peritoneal disturbance, and apart from other visceral disease.

The *treatment*, if seen sufficiently early, consists in opening the abdomen, ligaturing the pedicle, and cutting away the tumour.

Recurrence is not unusual, but rarely at the site of the original growth.

(B) Cystic New Growths.

If the ovary be considered from an embryological aspect, it will be found to consist of two portions:

1. The ovary proper, or *oöphoron*, which contains the Graafian follicles.
2. The hilum, or *paroöphoron*, at which the vessels enter and leave the ovary; it contains no Graafian follicles, but consists of the remains of the fœtal structure called the Wolffian body. In close relation with this is the *parovarium*.

Ovarian cysts may arise from either of these portions. In the *oöphoron* from distension of a fully developed Graafian follicle, or from changes in the immature follicles, which as a rule atrophy, but may grow and proliferate; while in the *paroöphoron* they may originate in consequence of a cystic distension of the tubular remains of the Wolffian body.

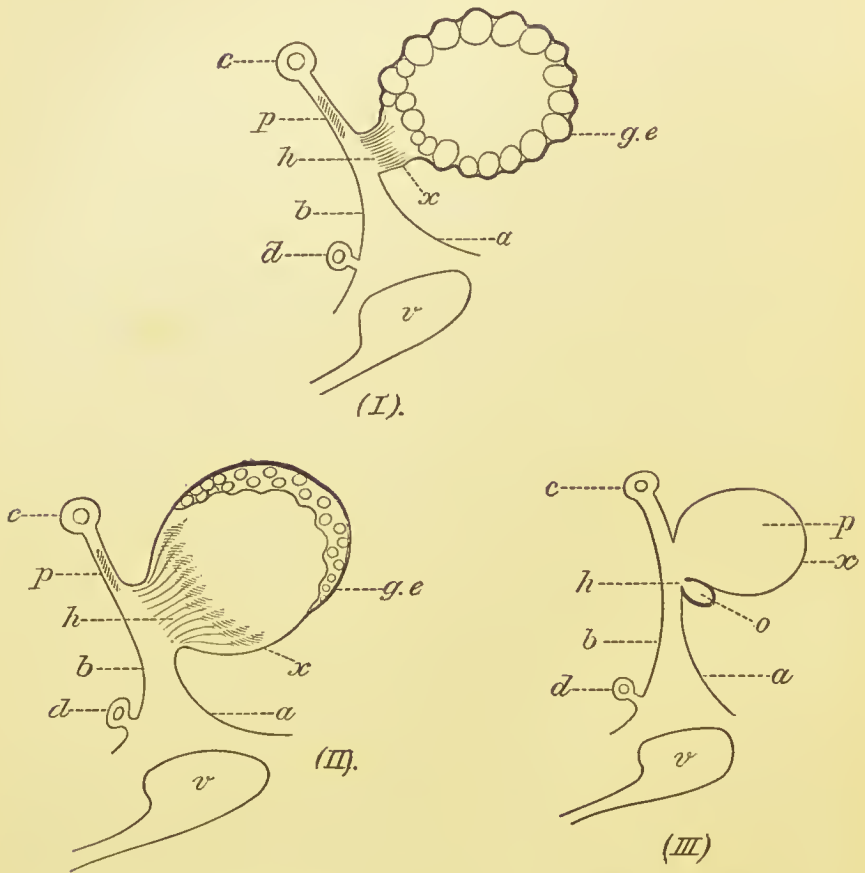
In addition, we have "dermoid" cysts, cysts in which some malignant change has taken place, and "parovarian" cysts.

I. **Cysts arising in the Oöphoron, or Ovarian tissue proper**, may be unilocular, but are more commonly multilocular. If a section is made of the wall of a single cyst, we have (1) most externally a peritoneal layer, consisting of cubical or flattened epithelium; (2) a fibrous coat of varying thickness and arranged in several layers; within this there is (3) a true mucous layer, which in the early stages of the disease may be simply the *membrana granulosa*, while in the later stages and in larger cysts it is formed of cubical or flattened epithelium (Fig. 116, A). This may atrophy from the pressure of the contained fluid; the *paroöphoron* becomes stretched and obliterated as the ovary increases in size (Fig. 115, I).

A multilocular tumour consists of a collection of various-sized cysts, similar in structure to the unilocular form: the lining membrane, however, of these may take an active growth, producing peculiar glandular structures in the cysts, and giving to this variety the name of *proliferating glandular cyst*, or adenoma.

II. **Cysts arising in the Paroöphoron, or Hilum**.—Here the tumour is usually unilocular: as it grows, the shape of the ovary proper is not altered until a considerable size is reached (Fig. 115, II). The tumour pushes its way between the layers of the

FIG. 115.



Left broad ligament, viewed from left side (semi-diagrammatic) indicating mode of origin of

- I.* Multilocular cyst of oöphoron.
II. Papillomatous cyst of paroöphoron.
III. Parovarian cyst.

- | | |
|--|--------------------------------|
| <i>a.</i> Posterior layer of broad ligament. | <i>x.</i> Peritoneum. |
| <i>b.</i> Anterior layer. | <i>h.</i> Hilum (paroöphoron). |
| <i>c.</i> Fallopian tube in section. | <i>p.</i> Parovarium. |
| <i>d.</i> Round ligament. | <i>o.</i> Ovary (oöphoron). |
| <i>g.e.</i> Germinal epithelium. | <i>v.</i> Vagina. |

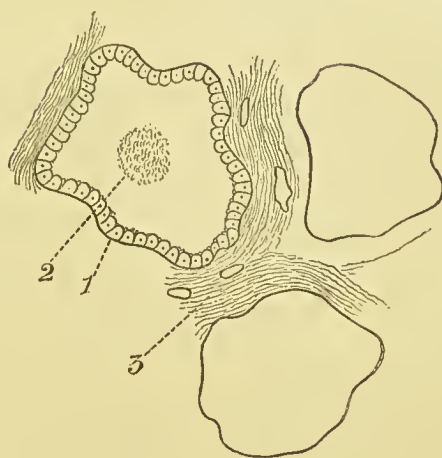
In Fig. *I.* there is a multilocular cyst, formed of cystic and solid portions ; the hilum is beginning to be flattened out.

In Fig. *II.* a papillomatous cyst, the true ovarian or Graafian follicle-bearing tissue in process of expansion.

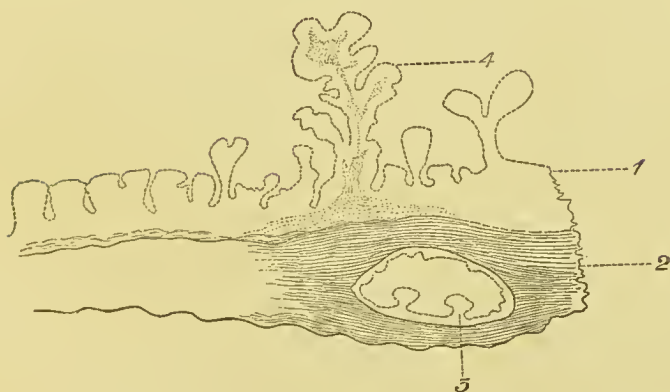
In Fig. *III.* parovarian cyst, ovary unaltered.

FIG. 116.

A.



B.



A.

Microscopical structure of a multilocular (oöphoric) cystoma.

1. Cubical epithelium lining cyst.
2. Contents of cyst (shrunken into the centre in preparation).
3. Fibrous tissue between cysts.

B.

Microscopical structure of a papillomatous (paroöphoric) cystoma.

1. Mucous membranc lining the interior of cyst.
2. Cyst wall composed of fibrous material.
3. Secondary papillomatous cyst.
4. Proliferating papillomatous growth.

broad ligament and towards the uterus; the Fallopian tube may be stretched over it in an arciform manner, and at the same time lengthened, owing to its fixation at both uterine and fimbriated extremities.

On cutting into a cyst, it is found to be lined with mucous membrane, which is, however, dotted over with papillomatous or warty growths (Fig. 116, B). These may be very few in number, or so numerous and rapidly growing as to rupture the cyst wall; infection of the peritoneum may be a secondary result of this accident. To this variety is given the name of *proliferating papillomatous cyst*.

III. Dermoid Cysts.—These arise from an abnormal invagination of the epiblastic layer of the embryo. They consist usually of a single cyst, with fibrous walls of varying thickness, covered by epithelium; the inner aspect may be formed entirely of skin, or this only occurs in patches; in the skin are true sweat glands, sebaceous follicles, and hair. The cavity is occupied by a soft, cheesy material of varying consistence, and is made up of the detritus of epithelium and cholesterin; mixed with these are hairs lying loose, or coiled up in a ball: in the cyst wall are found beside the skin, teeth, bones, and structures like mammæ, the majority of which, it will be noted, in their normal situation arise from the epiblast. There seems reason for believing that dermoid cysts may undergo malignant change. They usually occur on one side only, and vary much in size; a dermoid may complicate an ordinary multilocular cyst of the same ovary.

IV. Parovarian Cysts (Fig. 115, III) are derived from a dilatation of some portion of the parovarium: they are usually mono-cystic and thin-walled, rarely attaining to large dimensions; tapping by means of an aspirator usually leads to a permanent cure. The contained fluid is about 1005 in specific gravity, quite clear and colourless; albumen is found present in very small quantities.

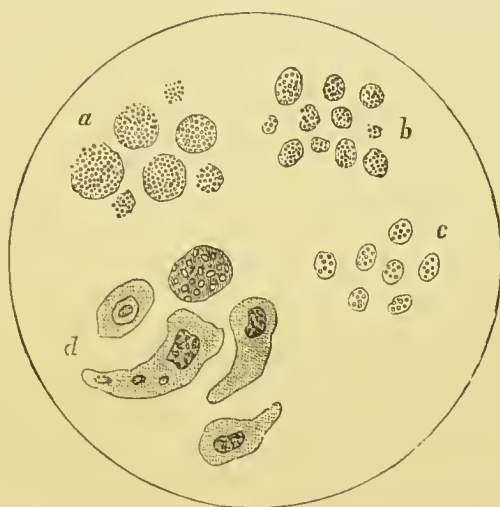
The Contents of Ovarian Cysts.—In the unilocular variety the fluid is of a serous nature and rarely viscid, with a specific gravity varying between 1007 and 1020. The colour of the fluid varies according to the size and the age of the cyst from a greenish yellow to a dark brown; in the multilocular form the fluid is much more viscid, and may be so gelatinous as not to pass through a trocar. Albumen or mucin is present, and a few cholesterin crystals may be found. The cellular elements occurring in ovarian fluid are the so-called "ovarian granular cells," epithelial cells, blood and pus corpuscles, granular material, and oil globules. Ovarian granular cells are from $\frac{1}{50000}$ to $\frac{1}{20000}$ of

an inch in diameter, and consist of granular matter in a transparent basis, but no nucleus is present; the addition of acetic acid makes the granules more clearly defined, but if added to pus cells it increases their size, and permits one or more nuclei to be seen (Fig. 117).

Course and Terminations.—An ovarian tumour, when once formed and if cystic, tends to increase in size at a more or less rapid rate; when too large to be contained in the pelvis it ascends into the abdominal cavity, and the swelling thus produced is often the earliest indication of its presence.

It is found that fibro-myomata of the ovary grow exceedingly

FIG. 117.



Microscopic appearance of the most characteristic contents of ovarian cystomata.

- a. Compound granular cells of Gluge.
- b. Drysdale's corpuscles.
- c. The same treated with acetic acid.
- d. Columnar epithelium.

slowly, and may not attain sufficient size, or produce marked enough symptoms to warrant operative interference. Dermoid cysts, as a rule, are only of slow growth, but it must be remembered that they may possibly undergo malignant change. Cysts which are simply due to dropsical effusion into a Graafian follicle (hydrops folliculi) rarely give rise to serious symptoms or attain any great size.

The proliferating cysts, whether glandular or papillary, are, on

the contrary, quickly growing, and may, if not interfered with, run a fatal course in from two and a half to three years. Malignant tumours of the ovary are necessarily of a rapidly fatal character, and if interference is advised, it must be done very early.

The following *complications* may arise during the growth of an ovarian tumour:

1. Impaction of the tumour in the pelvis;
2. Torsion of the pedicle, which is due to a rotation of the cyst upon its own axis, and may be produced by the action of a pregnant uterus or in consequence of violent and sudden exertion: to avoid of this accident, the cyst must be free from adhesions. The twisting of the pedicle produces strangulation of the vessels contained in it, which consequently become over-distended; rupture and hæmorrhage into the cyst may follow: if it is suddenly distended from the presence of the blood, violent pain and shock result; death may occur if the patient is not subjected to operation.
3. Inflammation of the peritoneum covering the cyst, and the subsequent formation of adhesions with various organs, particularly with the intestines, omentum and rectum.
4. Ovarian cystitis, or inflammation of the lining membrane of the tumour, with formation of pus; this was a common sequence of tapping.
5. Hæmorrhage into the cyst cavity; this may result from torsion of the pedicle, or in proliferating papillomatous cysts, spontaneous bleeding occurring from the warty growths projecting from the sac wall.
6. Rupture of the cyst wall may arise from over-distension or from traumatic causes: if the tumour is free in the abdominal cavity, the fluid will naturally escape into the peritoneum and may possibly set up fatal peritonitis: if it is intimately adherent to one of the viscera, as the rectum or bladder, it may burst into it, and spontaneous cure of the tumour result. It is doubtful whether a cyst may rupture and absorption of its contents take place: it can only do so if the fluid be of a non-irritating quality.
7. Constriction and obstruction of the bowel by the pedicle.
8. The formation of a considerable amount of ascites, especially in malignant and papillomatous tumours.

Symptoms.—These must be considered—

1. When the tumour still occupies the pelvic cavity ;
2. When it has risen out of the pelvic into the abdominal cavity.

1. In many cases *the presence of an ovarian tumour in the pelvic cavity* gives rise to absolutely no symptoms: in others there is pain and derangement in the menstrual functions. The pain is of varying intensity, and is situated in one or other iliac fossa, according to the site of the disease. Menstruation may be suppressed or diminished in quantity, rarely is there menorrhagia; in addition there may be pelvic uneasiness, particularly during exercise; rectal and vesical irritation occur very rarely, unless the tumour becomes impacted and adherent.

2. The first indication to the patient that anything is wrong with her is the increase in size of the abdomen, which in addition often produces great mental worry from possible remarks made by observers. The swelling may appear on either side if the pedicle is short, or in the median line if long: slight abdominal pains occur from the distension of the cyst, and from local peritonitis arising. As the tumour increases pressure symptoms will make their appearance :

- (a) Upon the *bladder*, preventing distension of that organ, and producing consequently a frequent desire to micturate; cases have been recorded where the ureters have been pressed upon.
- (β) Upon the *rectum*, producing constipation, but never total obstruction.
- (γ) Upon the *intestines and stomach*: these are pushed upwards and backwards, and necessarily their functions must be interfered with; dyspepsia, vomiting, and anorexia result.
- (δ) Upon the *thorax*: the action of the diaphragm is curtailed, and the lungs in consequence cannot expand: the heart's action is interfered with, and palpitation and dyspnoea arise.
- (ε) Upon the *venous system*: the superficial abdominal veins become much distended owing to the pressure on the iliac veins, preventing return of blood to the heart: for the same reason, thrombosis in the veins of the legs and œdema may follow. Cramps and twitchings of the limbs result from interference with their circulation.

If *pregnancy* is complicated by the presence of an ovarian

tumour, a miscarriage will result as a rule, unless operative interference is resorted to.

The *general condition* of the patient during the growth of the cyst is steadily on the decline; a so-called ovarian face is described, but too much stress should not be laid upon it; gradual emaciation and increasing weakness, with difficulty of movement are the leading features of the illness, death taking place from exhaustion, or any of the intercurrent complications already detailed.

CHAPTER XVIII.

AFFECTIONS OF THE OVARIES—(*continued*).

Diagnosis.—(A) When the tumour is small, contained in the pelvic cavity, and lying behind or to one side of the uterus, and therefore felt only per vaginam or per rectum.

(B) When the tumour is larger, has risen out of the pelvis into the abdominal cavity, and its chief features can be made out per hypogastrium, but diagnosis is aided by vaginal and rectal examination.

(A) When an Ovarian Cyst is Intra-pelvic.

It is then usually mobile, but may be attached to the uterus or Fallopian tube by adhesions. It is elastic to the touch, globular, and with a smooth surface; the tumour itself is not painful; the uterus may be pushed out of its place, but is mobile, and not as a rule enlarged. With thin abdominal walls or under an anæsthetic, the bimanual examination is of great value, and should always be carried out.

(i.) An ovarian cyst may be simulated, when laterally placed, by:

1. *Solid, innocent ovarian tumours*: these are of extreme rarity.
2. *Solid, malignant ovarian tumours*: these grow rapidly, soon become fixed, and are accompanied by much pain (p. 222).
3. *A hydro-, pyo- or hæmatosalpinx*. In pyosalpinx, there is usually a history of pre-existing pelvic disease, or gonorrhœa: the tumour is rarely freely mobile owing to adhesions to the ovary or uterus; the swelling may be elongated, and fusiform: it is more common to have affection of both sides than one only (p. 207).
4. *Parovarian cyst*.
5. *Extra-uterine gestation* up to the time of rupture of the tube: here there will be a history of amenorrhœa and other pregnancy signs (p. 211).

6. *Extra-peritoneal hæmatocele*: in this condition we have the sudden onset of the symptoms, and often at or about menstruation. The uterus is usually fixed and pushed over to the side opposite to the disease, except when the exudation of blood is high up in the broad ligaments, when the uterus is semi-mobile only (p. 200).
7. *Pelvic cellulitis*, in the state of phlegmon or suppuration, is in the majority of cases the result of sepsis after labour, abortion, or operation: the history is therefore of great importance; the physical signs are as in hæmatocele; if suppuration be present, rigors and hectic temperature must be looked for.

(ii.) Swellings posterior to the uterus, simulating an ovarian cyst (Fig. 92), are:

1. *A fibroid or dilated Fallopian tube* prolapsed into Douglas's pouch, and there remaining mobile or fixed.
2. *Retroverted or -flexed non-pregnant uterus*: if mobile the fundus can be replaced by the sound (p. 146).
3. *Incarcerated retroflexed gravid uterus* is fixed and may be pushed up into the abdominal cavity, by prolonged pressure exerted to the left or right side of the sacral promontory, under an anæsthetic or without it.
4. *Retro-uterine fibroid*; the sound should clear up the diagnosis (*vide* Fig. 91).
5. *Encysted serous perimetritis* (*vide* Fig. 106): here the history is of great value; if a patient had passed through an attack of pelvic peritonitis and the temperature still showed an inclination to fluctuate, with the formation of a retro-uterine tumour, the diagnosis would point to encysted fluid.

(B) When an Ovarian Cyst has become Abdominal.

The increase in size is the sign most noted by the patient.

Let us suppose that the swelling has reached to above the level of the umbilicus; the following steps must be taken to make a diagnosis of ovarian cyst; the directions laid down in Chapter ii. should be followed, the surface of the abdomen being mapped out into certain areas (Fig. 118).

Per Hypogastrium:

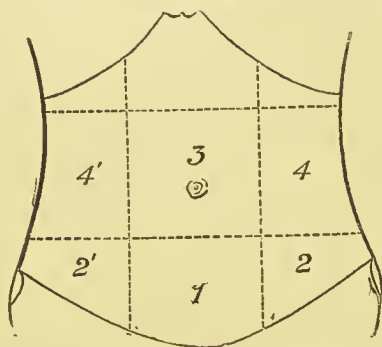
(a) By *inspection*: the woman being in the dorsal decubitus, the abdomen is found enlarged and projecting antero-posteriorly; the skin may be pigmented at the usual sites observed during pregnancy, and the striated lines may be present. Any veins

coursing over the skin covering the tumour must be noted. The umbilicus either bulges or is simply flattened out. The surface of the swelling appears as a rule smooth, but may be undulating from the presence of secondary cysts or solid portions of the tumour (Fig. 119, *a*). Projection may be more marked on one side than the other. The abdominal walls are generally thinned out and rarely œdematous: should any intestines lie between the tumour and the skin, they may be detected by their vermicular action which is often distinctly visible; aortic pulsations may be transmitted to the surface. If the patient attempts to sit up the recti are placed on the stretch and the tumour is evidently beneath them: in most cases ascent of the tumour during expiration and *vice versa* can be observed.

(β) By **palpation**, any irregularity of the tumour surface can be mapped out and any local tenderness noted; general fluctuation is often absent, owing to the number of the component cysts or to the extreme viscosity of the contained fluid; circumscribed areas may exist in which fluctuation can be obtained: the ulnar surface of an assistant's hand should be pressed firmly along the median line of the abdomen so as to eliminate the fluctuant sensation normally imparted by the abdominal walls.

(γ) On **percussion**, dulness can be made out over the whole lower abdomen, extending upwards nearly to the fundus of the tumour; a complete expiration should be made, and no effort at inspiration attempted, while the upper border of the tumour is carefully percussed out (Fig. 119, *exp.*); if then a deep inspiration be taken, the breath held, and the same process be carried out (Fig. 119, *insp.*), a considerable descent of the line of dulness will be found to have occurred. There is resonance in the flanks (Fig. 119, *c c*), which is unaltered by turning the patient over to either side, unless an excessive amount of ascites be present. When the contents are very fluid and contained in a single cyst, a gentle tap with the fingers of one hand on one side of the tumour will give a distinct shock to the fingers of the other hand, applied over the opposite side of the tumour.

FIG. 118.



The surface of the abdomen, mapped out into areas.

1. Hypogastric region.
- 2' 2. Right and left iliac or ovarian regions.
3. Umbilical region.
- 4' 4. Right and left lumbar regions.

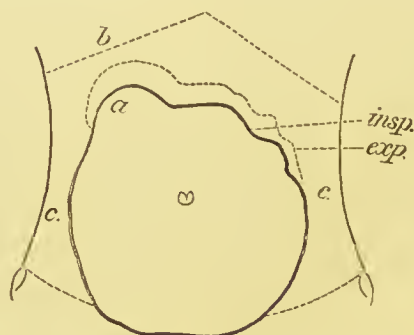
(δ) **Auscultation** gives no sound diagnostic of an ovarian cyst. There are, however, certain signs which may be associated with a tumour of this nature, viz. :

1. Those produced by flatus passing along the intestines ;
2. A spurious uterine souffle, especially if much solid material be present.

Creaking and scraping notes have been described, but are of no value as means of diagnosis.

(ε) **Mensuration.**—The size of the tumour and its relations to certain points of the body must be ascertained by the use of the tape measure.

FIG. 119.



Surface view of a multilocular ovarian cyst (left side).

The surface in this case was undulating, owing to the presence of secondary cysts as at (a). No marked fluctuation could be made out : the sound passed just over the normal distance, and the uterus was retroverted and fixed : at the operation the contents were colloid, and it was found necessary to remove them by hand.

All the surface *within* the dark line gives a dull note on percussion, and indicates the level of tumour during *inspiration*. The dotted line shows the level of dulness attained during *expiration*.

b. Hepatic dulness.

c.c. Resonance in flanks.

The two measurements which are of greatest importance are :

1. The greatest circumference of the abdomen, which will be found as a rule to exist *below* the level of the umbilicus.
2. The distance from the tip of the sternum to the umbilicus and from the umbilicus to the upper border of the symphysis pubis.

In the *normal* abdomen the latter measurement is always the smaller, while in an ovarian swelling, owing to the greater stretching of the lower hypogastrium as compared with the epigastrium, it is often the longer.

Other dimensions of minor importance are : from the umbilicus to the anterior superior spine, and from one of the spines of the lumbar vertebral column to the umbilicus. Both of these will indicate any increase in size of one side over the other.

A tracing may be made of the outline of the body by means of a cyrtometer.

Per Vaginam.—The uterus is fixed, or not freely mobile, as a rule. It may be normally situated, retroverted, pushed low down into the pelvis, or drawn up out of reach towards the abdominal cavity ; the sound passes the normal or slightly above the normal distance, and will indicate the direction of the uterine cavity, which may be backwards or to the side, according to the pressure effects of the tumour.

The cervix is not softened, but may have a congested appearance, simulating the violet discoloration of pregnancy. The tumour itself may not be felt ; but solid portions may often be made out in the posterior cul-de-sac, and must be differentiated from scybalæ.

Per Rectum.—Confirmation of the vaginal examination is easily made. If there is much traction upwards of the uterus by the tumour, and if the cervix be held by a volsella from below, the pedicle of the cyst can be made out as a sharp band, extending from either uterine cornu ; in it may be felt a pulsating vessel, the ovarian artery.

Differential Diagnosis.—Having indicated the usual physical signs distinguishing an ovarian tumour of considerable size when it has risen out of the pelvis into the abdominal cavity, we must detail the various swellings which are liable to be mistaken for it. These are :

1. Fibro-myomata ;
2. Normal pregnancy, especially if complicated by hydramnion or excess of liquor amnii ;
3. Ascites ;
4. Pseudocyesis, and other phantom tumours ;
5. Distended urinary bladder ;
6. Extra-peritoneal hæmatocele ;
7. Advanced ectopic gestation ;
8. Encysted serous perimetritis and pelvic abscess ;
9. Prolapsed and enlarged spleen ;
10. Floating kidney and nephritic tumours.

1. **Fibro-myomata** have already been considered in Chap. xiii. (p. 158), where their prominent and distinguishing physical signs have been enumerated.

2. **Normal Pregnancy** (*vide* Appendix, p. 261).—In pregnancy with excess of liquor amnii, some difficulty in diagnosis may arise,

and especially in connection with large unilocular cysts. Here the history of amenorrhœa, with sickness and mammary changes, will be of great value. The abdomen is usually over-distended, the tumour, being only of a few months' growth, and corresponding in size to the duration of the supposed gestation. Ballottement is generally very evident. The dull areas with resonance in the flanks will be as in an ovarian tumour; foetal heart sounds may be present, and either obscured by the amount of fluid present or the position of the fœtus; the rhythmic contractions and relaxations of the uterus should be observed.

The physical signs of cervical softening and violet staining of vaginal mucous membrane are frequently conclusive.

3. **Ascites** may result from a lesion of some organ like the heart or liver, both of which should therefore be carefully examined.

When the patient lies on her back the abdomen bulges laterally, and its greatest circumference is about the level of the umbilicus; if the amount of fluid be scanty there is no antero-posterior projection, the abdomen being flattened (Fig. 120). If the distension be excessive, the skin may be œdematous, glistening, and of a deep pink colour. The umbilicus is situated in its normal relation to the tip of the sternum and the upper border of the symphysis pubis; in addition it may be thinned out and prominent. The feet are often œdematous.

On palpation no distinct tumour can be made out, nor is aortic pulsation transmitted. On percussion there is dulness in both flanks and across the lower hypogastrium, the upper edge of this dulness taking the form of the segment of a large circle (Fig. 120: 1); above this line and around the umbilicus there is resonance; the level of dulness changes with the position of the patient: if she sits up, this is depressed and an increased bulging of the lower hypogastrium results from the change in level of the fluid. If the patient is turned on to her left side, percussion over the right flank will elicit a resonant note, and *vice versa*. If sufficient fluid be present, a distinct impulse will be transmitted on sharp percussion from one side to the other.

The above physical signs are subject to exceptions:

1. If, owing to the shortness of the mesentery, the intestines cannot float up to the abdominal wall, then a dull note will be elicited around the umbilicus, on percussion.
2. If certain portions of the intestines are bound down by adhesions, fluid will collect in front of them and produce a dull note.
3. If the colon become extremely distended with flatus, either flank may become resonant instead of dull.

Per Vaginem.—The uterus is nearly always normal in size and position; if local peritonitis be present, its mobility may be impaired; there is no softening or staining of the cervix. Bulging downwards of the posterior cul-de-sac may occur; bimanually, there is well-marked thrill and fluctuation. No solid parts are as a rule detected behind the uterus.

4. **Pseudocyesis**, or spurious pregnancy and other phantom tumours, such as excessive fat in the abdominal walls, extreme

FIG. 120.

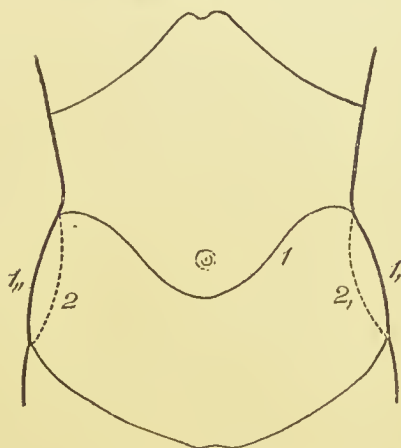


Diagram to illustrate line of dulness in ascites (from a nullipara with tubercular peritonitis affecting the pelvic peritoneum).

1 1' 1'', line of dulness due to fluid.

2 2', outline after removal of ascitic fluid.

The swelling simulated a monocystic ovarian tumour owing to rigidity of the abdominal walls; under chloroform the aorta pulsating and the vertebral column could be distinguished.

flatulent distension of the intestines, and muscular rigidity, are all cleared up by the administration of an anæsthetic. When deeply under its influence, the hand can feel the aorta pulsating and the anterior surface of the spinal column, no tumour being present.

5. **A distended Urinary Bladder** may result from hysteria or the pressure of the cervix of an incarcerated retroflexed pregnant uterus; it is felt above the brim of the symphysis pubis in the median line as a soft, fluctuating, mobile and painless tumour, and may extend to the umbilicus. Dulness is elicited over its surface on percussion. Passage of the catheter will clear up any doubt as to its nature.

6. **Extra-peritoneal Hæmatocele.**—The history of an attack would show that the illness began suddenly, probably during or immediately before a monthly illness, and that pain and collapse were the chief symptoms at the time, both soon passing off; under normal conditions the patient would tend to improve. Physical examination would show that the uterus was fixed by the swelling, that it rarely extended more than halfway up to the umbilicus, and that it was not so rounded in shape as is an ovarian cyst.

If any signs of early pregnancy are detected, the cause of the hæmatocele is possibly an intra-ligamentous rupture of an ectopic gestation (p. 212).

7. **Advanced Ectopic Gestation**, whether abdominal or extra-peritoneal; the history, such as pregnancy signs, abnormal or not, should aid us in the diagnosis; then there are the symptoms accompanying a presumed rupture of the tube, followed by gradual enlargement of the abdomen. A multilocular cyst of the ovary with a large proportion of solid matter, simulates somewhat closely an extra-peritoneal fœtation.

8. In encysted serous Perimetritis (p. 188) we must chiefly rely on the previous history; there has been a chill during menstruation, or a labour, abortion, or operation followed by sepsis, and the usual local signs of peritonitis have arisen with the formation of a fluctuant swelling behind the uterus, pushing the intestines forwards. Suppuration would be indicated by the onset of rigors and a hectic temperature.

9. **Prolapsed and Enlarged Spleen.**—This is extremely rare, but if this organ is pressed into the pelvis, there seems to be no definite method of making an accurate diagnosis except by opening the abdomen, when the peculiar colour of the tumour-surface will make its nature clear. The cachexia accompanying an enlarged spleen must not be mistaken for the peculiar aspect sometimes present in ovarian tumour (ovarian facies).

10. **Tumours of the Kidney.**—These grow from above downwards, are always one-sided, and some pathological condition of the urine is also usually present. As the shape of the kidney is altered in disease the typical reniform outline must not be looked for. The colon may be made out by percussion passing *in front* of the tumour.

Treatment consists in removal of the tumour after ligature and cutting through of the pedicle—ovariotomy. The operation has been frequently performed through the vagina, but the safest and easiest method is by opening the abdomen. After a certain diagnosis is made, nothing can be gained by delay.

(i.) **Preparation for Operation.**—The skin and kidneys should

be kept acting by a daily hot bath and diluent drinks, and the urine carefully examined; any considerable amount of albumen apart from pressure, with casts indicative of chronic nephritis, would as a rule contra-indicate operative interference. The bowels should be regulated by a purgative at night, so that no scybala remain in the intestines. The patient is best confined to her bed absolutely for three days before the operation, during which time white foods only are permissible. Diet should be limited to liquids for the twenty-four hours immediately preceding the operation. Before anæsthesia is given, the bladder must be emptied by a catheter, and the pubic hair shaved off. The whole abdomen should be thoroughly washed with soap and water, then rubbed over with a mixture composed of equal parts of corrosive sublimate solution (1 in 500) and carbolic acid solution (1 in 20), particular care being taken to turn out the dirt which accumulates in the wrinkles of the umbilicus; an antiseptic pad may then be fastened over the abdomen.

(ii.) **Actual Operation.**—Anæsthesia is produced by pure chloroform, ether, or methylene; each has its strong advocates.

As the scope of this work does not permit of descriptions of elaborate operations such as this, only the leading steps of ovariotomy will be touched upon: these are—

1. *Opening the Abdomen*, the length of the incision varying from three to five inches or more; as the thickness of the walls varies, this should be done by careful use of the knife. The tumour may be adherent; if so, some difficulty is experienced in distinguishing its capsule from thickened and inflamed peritoneum.

2. *Separation of the Adhesions*.—The hand being passed into the peritoneal cavity, it is swept round the contour of the tumour, breaking down any adhesions, until the whole tumour is comparatively free.

3. *Removal of the Cyst Contents*.—If the consistence of the contained fluid is sufficiently thin, a trocar with a long tube attached is plunged into the tumour, and the contents gradually evacuated, care being taken to avoid escape of what is often an irritating material into the peritoneal cavity. If the contents are too solid to be removed in this way, the hand must be introduced, the interior of the sac broken down, and the material got rid of by scooping it out; the collapsed sac can then be drawn out at the abdominal wound.

4. *Ligature of the Pedicle*.—The pedicle consists of the Fallopian tube and broad ligament, with one or more large vessels: if this is sufficiently thin, a simple ligature around it of carbolised silk will be enough: but usually it is necessary to transfix it with

a threaded pedicle needle, and then to tie each half. The sac can now be cut away, and the pedicle surface inspected to see if any hæmorrhage is going on; if not, the ligatures may be cut off short, and the stump dropped into the peritoneal cavity.

5. *Examination of the other Ovary.*—This is necessary, as if cystic disease has commenced, it may be removed at the same time.

6. *Peritoneal Toilet.*—This consists in removing any blood-clots or other irritating material from the peritoneal cavity, by means of a hot boracic solution douche, or by soft sponges passed down into the posterior cul-de-sac, into which blood generally tends to collect. The greatest care should be adopted in this proceeding, too much force not being used, as the intestines may be bruised or torn. Shock sometimes follows the intra-peritoneal douche and it should therefore be administered only where there has been an escape of the cyst-contents into the peritoneal cavity and not as routine practice.

7. *Closure of the Abdominal Incision.*—After having ascertained that no further hæmorrhage or oozing is going on, a flat sponge should be laid over the intestines and the sutures passed, the peritoneal flaps being first brought together by fine catgut or silk; union takes place in from twenty-four to forty-eight hours. Some authorities advise the insertion of a separate set of catgut sutures uniting the edges of the recti muscles, as an additional safeguard against subsequent hernia. The dressings should be of sal alembroth gauze, and need not be changed for a week.

Where the contents have been septic and escaped into the peritoneal cavity, or where venous oozing cannot be stayed, the introduction of a glass tube, with its distal end lying in the posterior cul-de-sac and its proximal extremity in the lower angle of the wound, is necessary.

Rigid antiseptic rules must be adhered to throughout the operation.

The above description is that of a simple and fairly uncomplicated operation: but many difficulties and accidents may arise during its progress. They are—

1. Hæmorrhage from the adhesions;
2. Rupture of the bladder or injury to the ureters;
3. Tearing through the intestinal wall, especially in connection with adhesions to the cæcum;
4. Slipping of the pedicle ligature;
5. Escape of the cyst-contents into the peritoneal cavity.

(iii.) *Subsequent Progress.*—Any untoward symptoms likely to appear usually arise before the end of the third day. After that

time the convalescence is generally very rapid, and the stitches may be removed on the tenth day, or even earlier.

Uterine hæmorrhage of varying amount (metrostaxis) often occurs before forty-eight hours have elapsed.

Two bad signs are continual retching or vomiting and distension of the abdomen from flatus: the former is often relieved by sipping very hot water, or in extreme cases great relief is obtained by washing out the stomach, the latter by passing a long rectal tube and allowing it to stay there for an hour at a time. A quick pulse, without corresponding rise in temperature, in association with tympanites and vomiting, is strongly indicative of septic peritonitis, and the patient frequently succumbs. Any sign of redness and tension about the stitch openings should be relieved by cutting the sutures, otherwise "stitch abscess" may follow and convalescence be delayed. The bowels should be opened by enema about the seventh day, and solid food may then be given. The wearing of a properly adapted belt for at least a year subsequently, will prevent the formation of a ventral hernia.

(iv.) *After-history*.—If one ovary only has been removed, the patient menstruates normally and may become pregnant: if both, however, certain constitutional and local changes occur, which constitute an artificial menopause (p. 59), during which time nervous affections of varying severity may appear.

Two after-results must be apprehended—viz., the formation of a ventral hernia, and the strangulation of some portion of the intestines by adhesions which have formed between the stump and the peritoneum, appendix vermiformis, or cæcum.

Each case, if possible, should be watched for many years, a report being taken at each visit, made not less than twice a year.

REMOVAL OF THE UTERINE APPENDAGES.

This has been termed Battey's or Lawson Tait's operation. Extirpation of the ovaries, or of both tubes and ovaries, whether healthy or diseased, has been carried out as a means of relief for certain morbid conditions of the uterus, ovaries, and general nervous system, in the hope that by arresting menstruation a cure may be effected.

These conditions are as follows:

1. *Pelvic pain*, usually worse at menstruation. Patients are unable to walk, and spend their lives lying down; they soon become the victims of narcotics in every form; no pathological lesion of importance can be discovered.

2. An *undeveloped state of the uterus*, associated with intense dysmenorrhœa, the patient being free from pain at other times; also in severe membranous dysmenorrhœa.
3. *Hæmorrhagic fibroids*, usually of the interstitial variety, in which the bleeding is uncontrollable and threatening the patient's life, or the growth very rapid.
4. *Hystero-epilepsy* and other neuroses, more especially in those cases where the fits and menstruation are apparently nearly associated.
5. *Prolapsed and adherent ovaries*, which are also inflamed.
6. *Osteomalacia*; arresting menstruation is said to stay the course of this disease.
7. *In Cæsarean section*, in order to produce future sterility.

It is found from experience that the effect upon menstruation varies very much: in some it is entirely arrested, and at once; in others after some considerable time, while in a certain number it is unaltered; dysmenorrhœa is produced in some instances.

Removal of the ovaries and tubes for pelvic pain, in hystero-epilepsy and after Cæsarean section, is useless mutilation; the pain, although temporarily relieved, is frequently as bad, or even worse, after the operation. There is a consensus of opinion as to its futility in all nervous disorders, while sterility is produced in a much more satisfactory manner after Cæsarean section by simply doubly ligaturing the tubes and dividing them. Conditions 1, 4, and 7 may therefore be excluded.

Osteomalacia is somewhat frequent in Germany, and removal of the appendages is practised there for the arrest of the disease, and it is said with success; but such a proceeding is still on its trial, and must not as yet be generally recommended.

In considering dysmenorrhœa due to an undeveloped uterus, theoretically, the operation should be a perfectly successful one; but many cases show us that menstruation may not be arrested, and even if it is, the patient suffers exactly the same pain, and experiences the same sensations every month, as if the flow were present; in addition, she is frequently the subject of various nervous disturbances.

If the ovaries are prolapsed and adherent, the patient is very often in a very pitiable condition; if married, she suffers intense dyspareunia—i.e., painful sexual intercourse, in addition to the symptoms already detailed (p. 219), and is usually sterile. Here again the best results would be expected from the operation, but in many cases, although there is absolute immunity from all bad symptoms for a time, there is a gradual return.

The treatment of hæmorrhagic fibroids by this method is much

more satisfactory, and in a large proportion of cases hæmorrhage ceases, the menopause arrives after the lapse of varying periods of time, and the tumour shrinks. In other cases no such sequence of events occurs, and the patient remains in her former condition, or the hæmorrhage increases in amount. It is clear, however, that this operation should always be undertaken before proceeding to the more radical and dangerous one of hysterectomy.

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CHAPTER XIX.

AFFECTIONS OF THE BLADDER AND URETHRA.

I. AFFECTIONS OF THE URETHRA.

THESE may be classified as follows :

1. A malformation in the form of **hypospadias**, which simulates spurious hermaphroditism (p. 93).

2. **Urethrocele**, or prolapse of the urethral mucous membrane, through the external orifice.

3. **Inflammation or Urethritis**.—This is nearly always the result of gonorrhœal infection; the patient has pain of a scalding nature during the act of micturition, and may require to pass urine oftener than is usual with her.

On examination per vaginam, the urethra will be felt much thickened and tender; on inspection the external urethral opening is seen pouting and inflamed; pus exudes on squeezing the tube from above downwards.

Treatment consists in hot hip-baths, and hot vaginal douches three or four times daily, with saline purges and opium if necessary: if the disease becomes chronic, painting the anterior vaginal wall with tinctura iodi every other day, and the insertion of various medicated bougies into the urethra, are recommended.

4. **Stricture** may follow severe labour or chronic urethritis; relief can be obtained almost without exception by the use of Hegar's graduated bougies.

5. **Urethral Diverticula**: these are situated in the urethro-vaginal septum, and open into the urethra which is of normal calibre by means of a small orifice; the chief symptom is a "progressive and increased frequency" of micturition with the appearance of a small, tender swelling in the anterior vaginal wall.

6. **New Growths** may be simple or malignant. Under the former is included *Urethral caruncle*. On inspection of the urethral orifice a swelling is observed, varying in size from a

pin's point to a filbert, and of red colour; it is extremely tender to the touch, bleeding readily: the growth may be pediculated or sessile, and usually grows from the posterior or lower border of the urethral opening. On microscopical examination it is found to consist of loops of dilated capillaries, lying in connective tissue, in addition to a certain number of nerves; most externally is a layer of squamous epithelium.

Symptoms.—(i.) Pain during micturition (dysuria), the cessation of the flow being often followed by the loss of a few drops of blood.

(ii.) Bleeding on walking, as is evidenced by the staining of the linen.

(iii.) If the patient is married, intense pain during coition.

(iv.) Vaginismus.

Treatment.—These growths are extremely apt to recur, without being necessarily malignant, hence any operation resorted to should be carried out thoroughly. Free application of Paquelin's cautery is as a rule sufficient; an anæsthetic may be necessary, but by painting the surface with a 10 per cent. solution of cocaine, very little pain is produced.

If the knife or scissors are used, care should be taken to ligature any bleeding vessels, as profuse hæmorrhage may occur shortly after the operation, if simple pressure alone be depended upon as a styptic.

Papilloma, sarcoma, and carcinoma are recognised by their microscopical characteristics.

II. AFFECTIONS OF THE BLADDER.

1. Malformation—*extroversion*.

2. Displacement—*cystocele*, or prolapse of the posterior wall of the bladder, and with it the anterior wall of the vagina.

3. Inflammations—acute and chronic *cystitis*.

4. Injuries to the bladder wall, producing the various forms of *fistulae*.

5. *New-growths*—*e.g.*, polypi, &c.

Means of Diagnosis.—(1) By the use of the sound as already described in Chapter ii. p. 44.

(2) By examination of the urine passed or withdrawn by catheter.

(3) By physical exploration of the bladder, through a dilated urethra.

Examination of the Urine.—The chief points to be observed are:

1. The quantity passed and its specific gravity. In health the

amount secreted and voided may vary between the extreme limits of one and four pints in the twenty-four hours, but is usually from two to three pints. In hysteria and under nervous influence, an enormous quantity may be passed, without any disease being present.

2. The existence of sugar, or albumen.

3. Its reaction, whether acid or alkaline: urine when first passed is slightly acid; the presence of pus is usually accompanied by alkalinity, occasionally by acidity.

4. If blood is present (hæmaturia): hæmorrhage may arise from the kidneys, ureters, bladder, or urethra, and unless the urine has been drawn off by catheter, from the generative organs.

5. If it is passed clear or cloudy, and if there is any deposit on standing, and its nature; the following may be present:

(α) Mucus, muco-pus, or pus.

(β) Urates or phosphates.

(γ) Uric acid, or oxalates.

Pus in the urine (*Pyuria*) may arise from:

(i.) The bladder itself.

(ii.) The rupture of a pelvic abscess into the bladder;

(iii.) A pyonephrosis, the pus travelling down either ureter;

(iv.) The urethra, as in acute urethritis or in a suppurating urethral diverticulum;

(v.) The vagina, if the urine is not catheter-drawn.

Examination of the Bladder.—The urethra is as a rule easily dilated; immediately after labour dilatation produces little or no pain; at other times, if cocaine is used locally, no anæsthetic is necessary; otherwise it is preferable. The author has found Hegar's graduated bougies (p. 84) act most efficiently and easily, a No. 19 or No. 20 bougie producing sufficient room to admit the index-finger; digital examination of the interior of the bladder can then be carried out.

Bimanual vesico-abdominal and vesico-vaginal palpation may be performed at the same time.

Observe if the examining finger is blood-stained on withdrawal.

Conditions ascertained by these methods:

1. The presence of a calculus, new growth, or foreign body.

2. The state of the lining membrane of the bladder—chronic cystitis, malignant disease, &c.

3. The thickness of the bladder walls.

4. The site of opening of a pelvic abscess into the bladder.

5. The site of a vesico-intestinal fistula.

For examination by specula (Skene's) greater dilatation of the urethra is necessary, and very considerable risk is run of paralysing sphincteric action, and thus inducing subsequent incontinence of urine. Resort to this procedure should not therefore be made except under certain conditions, such as to observe the orifices of the ureters.

(1) Extroversion of the Bladder.

This is a congenital defect, and is described, with its necessary treatment, in all works on surgery.

(2) Displacement of the Bladder.

From its loose attachments, especially to the symphysis pubis and anterior vaginal wall, this viscus is easily displaced; thus it is drawn upwards during labour, and if attached to a fibroid or ovarian tumour, it may reach as high as the umbilicus. It is displaced in a downward direction in prolapse of the uterus and of the anterior vaginal wall, with which the posterior wall of the bladder forms a cul-de-sac that projects towards the vulval outlet, and is called a *cystocele*.

A cystocele is increased by effort or straining, and is one of the causes of cystitis.

Treatment should at first be palliative; rest in the recumbent posture, with hot vaginal douches containing decoctum quercus $\bar{3}j$ to Oij of water, should be resorted to for a prolonged period. A Greenhalgh's pessary may be adjusted: it consists of a Hodge's pessary with one or more accessory cross-bars at the lower end (Fig. 71); the cystocele is in this way supported.

Intractable cases are best treated by operation: a circular patch over the vaginal surface of the pouch should be denuded of its mucous membrane and subjacent tissues, then the edges brought together by deep buried catgut sutures: the flaps themselves being adapted by silk sutures. A complete and permanent cure is frequently the result.

(3) Inflammations of the Bladder.

Acute Cystitis.—This term should be applied to an acute inflammation of the *mucous lining* of the bladder; this variety is by far the most common, but in certain severe cases, when resolution does not take place, the process may extend to the submucous and interstitial layers, producing a condition called *interstitial cystitis*; in extremely rare instances the scrous coat of the bladder may also become involved, and *pericystitis* results.

Pathology.—The mucous membrane becomes swollen, and is of a bright red colour; there is shedding of the epithelium, and the

surface is coated with a layer of mucus in a more or less viscid state.

Causation.—1. The passage of a dirty or septic catheter, whether after labour, operation, or in consequence of retention of urine.

2. The contact with the mucous membrane of decomposing pus from pyelitis, a ruptured pelvic abscess, or as a sequence of a cystocele.

3. Over-distension of the bladder from prolonged retention: this may be due to hysteria, the pressure of the cervix of a retroverted and incarcerated pregnant uterus, impacted fibroid, or ovarian tumour: sloughing of a part or the whole of the mucous lining may occur as a result in rare instances; it is brought about by the pressure due to the distension cutting off the blood-supply to the submucous tissue, and hence to the mucous membrane itself; the gangrenous mass is then extruded through the urethra either as a whole or in pieces.

4. Extension upwards from the urethra of the discharge of gonorrhœa.

5. The presence in the bladder of a calculus or foreign body introduced from without, such as a hairpin, catheter, tooth-brush, &c.

6. Tuberculosis and malignant disease of the bladder wall.

7. Extension of inflammation from other pelvic viscera, such as in parametritis, metritis, ovaritis.

8. The use of drugs, producing strangury, such as cantharides, oil of turpentine, copaiba.

9. Cold water vaginal douches after sexual intercourse.

Whether chill and injuries to the abdomen can alone produce the disease is somewhat doubtful.

The **Symptoms** are local and general. There is a constant desire to pass water; immediately before the act there is severe pain, localised at the neck of the bladder, which, unless the urine be allowed to pass, becomes agonising; temporary relief is obtained during the act; immediately, however, the inflamed walls come into contact the pain returns (strangury): micturition may take place every few minutes during an acute attack.

The *urine* is acid, and slightly turbid on *being passed*: on allowing it to stand a flocculent precipitate is produced, which consists of mucus mixed with a varying amount of pus, according to the severity of the attack: hæmaturia sometimes occurs (cystorrhagia).

The temperature and pulse in the slighter forms of the disease may be unaffected, but there is usually general constitutional disturbance, resulting from the pain and want of sleep.

Diagnosis.—Little difficulty should be met with in making an

accurate diagnosis; in addition to the state of the urine and the local symptoms, there is tenderness on pressure immediately above the symphysis pubis and over the surface of the anterior vaginal wall.

Course and Duration.—(a) The fortunate and most frequent result is resolution, which may take place in varying periods of from one to six weeks; the patient may, however, be subject to “irritation of the bladder” for some considerable time afterwards, if exposed to chill or owing to errors in diet;

(b) Sloughing of the lining membrane of the bladder;

(c) Chronic cystitis;

(d) Interstitial cystitis and pericystitis.

Treatment.—Relieve any of the causes already enumerated, more particularly stone, pyelitis, or a retroverted gravid uterus.

Absolute rest in bed is essential; milk diet, with plenty of barley-water and aerated fluids; sitting in a hot bath from time to time, and hot vaginal douches, give the greatest relief. Free but not excessive saline purgation is generally advisable. An alkali with hyoscyamus and potassium bromide are the only drugs of any avail. Alcohol, tea, and coffee should be prohibited. The catheter should never be passed.

A good mixture is as follows:

R. Potassii Bicarb.	.	.	.	.	.	gr. xv
Potassii Bromidi	.	.	.	.	.	gr. x
Tinct. Hyoscyami	.	.	.	.	.	ʒss
Inf. Buchu	.	.	.	.	.	ad ʒj

Four times daily.

Chronic Cystitis.—This is of more gradual onset, though it may follow in the acute form.

Pathology.—The mucous membrane becomes paler, almost grey in colour, and the epithelium is shed as before. The bladder wall becomes wrinkled, and in the later stages much hypertrophied, and scattered over the surface may be deep or superficial ulcerations; in the former case the muscular wall may be laid bare. Secondary results may be blocking of the orifices of the ureters, leading to hydronephrosis and uræmia; septic absorption may take place through the ulcerated surfaces.

Causation.—1. Those already enumerated under acute cystitis;

2. As a result of the acute form;

3. Tuberculosis and malignant disease (primary or secondary);

4. Artificial opening of the bladder by operation;

5. Paraplegia.

Symptoms are less marked than in the acute variety. Pain

increased frequency of micturition, much suffering on attempting to retain the urine, are present, and if much ulceration exist these are intensified.

The urine is alkaline, of low specific gravity, and may be extremely offensive and ammoniacal: it is thick on being passed, and the sediment produced on standing contains—

Mucus, of a more or less viscid character, and frequently adhering to the sides of the vessel;

Pus;

Bladder epithelium;

Phosphates.

The constitutional symptoms may be very grave, the patient dying from uræmia or chronic septicæmia: in some cases there is extravasation of urine resulting in much destruction of tissue, or pelvic abscess.

Treatment.—(a) *Palliative.*—A milk diet is usually recommended, but it has been the author's experience that this may lower the system too much and that provided alcohol, red meat, and curries are avoided, the patient is much the better for the prescription of a fuller diet. The object of medication must be to neutralise or acidify the alkaline urine. This is best attained by giving benzoate of ammonia, which has been proved to be converted into hippuric acid in the body. Hyoscyamus may be combined with it with benefit, as under:

R	Ammon. Benzoat.	.	.	.	.	.	gr. xx
	Tinct. Hyoscyami	.	.	.	.	.	5ss
	Inf. Buchu	.	.	.	.	.	ad ʒj

Three or four times daily.

It is desirable when the urine is offensive and evidently causing great irritation, to wash out the bladder once or twice a day by means of a double catheter; warm water may first be thrown in, then some soothing antiseptic solution as boracic acid injected, or the two may be mixed before use. Quinine, a perchloride of mercury solution, 1 in 4000, or 1 in 100 carbolic acid solution, may be used in rotation. This treatment may be necessary for several weeks.

As the bladder is in continual action (systole and diastole), it has been suggested that the retention of a catheter would produce the desired rest for the organ and promote cure. But the patient can rarely bear the irritation produced by the presence of a foreign body.

(b) *Operative.*—A button-hole opening is made in the base of bladder immediately above the sphincter vesicæ by means of a Paquelin's cautery; by some a simple incision into the bladder is

made, and its lining membrane sutured to the vaginal mucous membrane; a temporary vesico-vaginal fistula is thus produced, the urine cannot collect, and the bladder obtains physiological rest. This should be kept open for a varying period, during which the urine becomes normal and the pain disappears. The fistula may then be repaired.

(4) Vesical Fistulæ.

The most important of these are—

- (a) Vesico-vaginal;
- (b) Vesico-uterine;
- (c) Vesico-intestinal;
- (d) Vesico-utero-vaginal.

It will be only necessary to allude here to the first variety. This condition may result from a prolonged labour and subsequent sloughing of the bruised tissues, improper use of the forceps, or the spread of malignant disease; it may be artificially produced to promote cure in chronic cystitis.

The leading symptom is the inability to retain urine, more especially at night. The urine dribbles over the vulva and produces excoriations and soreness; an offensive ammoniacal smell emanates from the patient; amenorrhœa is the rule, but menstruation becomes regular again on repair of the fistula.

Treatment consists in paring the edges of the opening, being careful to avoid wounding the bladder mucous membrane (as profuse hæmorrhage may follow), and bringing the flaps together by means of silk or fine silver wire sutures. A catheter may be inserted into the bladder and retained there, or better, the urine should be drawn off every two hours, so that no distension of the organ may take place. The sutures may be removed on the tenth day. Complete union is proved by injection of warm milk into the bladder, when none of the fluid should escape into the vagina.

III. DISORDERS OF MICTURITION.

Mechanism of Micturition.—In the spinal cord are two centres, a *sphincteric* and *detrusor*; these are situated in the segments of the 3rd, 4th, and 5th sacral nerves, and they are under the control of impulses from the brain.

Urine is secreted by the kidneys, and passes down the ureters into the bladder by drops or jets from their orifices; the Y-shape indicative of the contracted condition of the bladder disappears (p. 17), and gradual dilatation or diastole takes place, and as distension goes on the bladder rises above the symphysis pubis.

When the bladder is distended, sensory impulses pass from its mucous membrane up to the brain and to the sphincteric and detrusor centres; in consequence of the sensory impression conveyed to the brain, the desire to urinate is experienced; the reflex impulse to the cord stimulates the detrusor centre and inhibits the sphincter centre. Should circumstances for the act of micturition be favourable, an impulse is sent from the brain—

1. To the tonic sphincter centre, inhibiting its action;
2. To the detrusor centre, to stimulate its action already excited by the reflex stimulus from the vesical mucous membrane;
3. To the abdominal muscles.

As a result two simultaneous actions occur :

1. Systole, or contraction of the organ on its contents;
2. Relaxation of the sphincter vesicæ and passage of the urine.

Expulsion is greatly aided by intra-abdominal pressure, as in straining. Micturition is more easily performed while sitting than lying down: many women are unable to pass urine in the latter position.

This sequence of phenomena constitutes the act of normal micturition, which should occur from four to six times in the twenty-four hours in the healthy female. A vesical "polarity" therefore exists as in the uterus, the poles being formed by the detrusor urinæ and the sphincter vesicæ. Deviations from normal, constitute "disorders of micturition": they are—

1. Retention of urine or inability to pass water;
2. Incontinence of urine;
3. A constant desire to micturate;
4. More or less pain immediately before, during, or after the act;
5. Difficulty in passing urine (dysuria); and
6. Sudden cessation of the flow during the act.

These may result from two sets of causes—

(A) Those due to existing morbid conditions of the bladder, urethra, or urine (*intrinsic*).

Under this class must be included the diseases already described in I. and II. Retention may result from an over-distension of the bladder, paralysing its contractile power—*i.e.*, vesical polarity is temporarily disturbed.

Incontinence of urine may be a congenital defect, or the result of urethral dilatation. It also occurs as "nocturnal incontinence" in young girls; this is usually the result of improper training during infancy or the presence of ascarides. Treatment consists in waking the patient at regular hours to pass water, limiting the

amount of fluid imbibed, and improving the general tone of the system by cold baths, spinal douches, and nervine tonics: the passage of a galvanic current from the fourth lumbar vertebra to the bladder is often efficacious. A dribbling often takes place when the bladder is over-distended—a fact which may easily mislead observer and patient. Passage of the catheter clears up the diagnosis.

In vesico-vaginal fistula, the draining away of urine is the leading symptom of the condition: it must be noted, however, that the retentive power of the vagina is considerable, and much urine may accumulate in it, thus forming a temporary bladder, this is especially the case when the fistula is high up.

A constant desire to micturate is a feature of what is termed the “irritable” bladder—*i.e.*, an organ which seems incapable of undergoing beyond a certain amount of distension. It seems often to be complicated by the secretion of very acid urine. Tincture of belladonna is usually administered in such cases, and with varying success.

Cystitis, malignant disease, whether primary or secondary, tuberculosis, calculi, foreign bodies, uric acid and oxalate crystals, urethritis, and urethral caruncle are all attended by an increased frequency in micturition.

Pain before the act is due to spasm of the bladder and is always present in cystitis, malignant and tubercular disease: pain *during* micturition is a feature of urethritis and urethral caruncle; pain immediately after the act is owing to the inflamed walls coming into contact with each other, as in cystitis, or grasping a calculus.

Difficulty in the passage of urine may be the result of a stricture, stone, urethral caruncle, cystocele or urethrocele.

Sudden cessation of the flow is usually due to a calculus or polypoid growth becoming suddenly fixed over the orifice of the urethra.

(B) Those due to actual disease or disordered function of the neighbouring viscera, or to nervous disturbance; the bladder and urethra being healthy (*extrinsic*).

There is marked sympathy between the uterus and bladder: the passage of a uterine sound through a tender os uteri will sometimes produce an intense desire to micturate: the onset of menstruation is frequently accompanied by an increased irritability of the bladder, especially in nervous women, or where there is dysmenorrhœa.

A normally situated and sized uterus never produces any bladder irritation. Painful and frequent micturition may result from pelvic cellulitis (parametritis), peritonitis (perimetritis),

cvaritis, and salpingitis: this is probably sympathetic in nature. The retention of hysteria is well known.

Pressure may give rise to bladder disturbance as a consequence of the presence of

1. Pregnancy—anteversion producing irritability: retroversion with impaction, partial or complete retention;
2. Fibro-myoma, or malignant disease of the body of the uterus;
3. Ovarian cystoma;
4. Labour: during the passage of the head over the urethra, there is mechanical occlusion; after the birth of the child retention may occur owing to the bruising of the sphincter vesicæ.

Complete prolapsus uteri may be complicated by retention owing to the distortion of the urethral canal.

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CHAPTER XX.

NEUROTIC AFFECTIONS PECULIAR TO WOMEN.

CONSIDERATION is now necessary of a class of diseases, unfortunately extremely common among the female sex, and probably on the increase. At present much confusion as to the terms to be applied to them exists, and in addition their primary causation (whether constitutional or uterine) is still a matter of great dispute. Until recently the term "hysteria" was given to these affections as a whole; the author proposes, however, to divide them into five classes, each of which has a distinguishing set of symptoms, although it is found by experience that no two cases are exactly alike.

I. Hysteria without the existence of Malnutrition or Uterine Disease.

This is most frequently observed among the well-to-do classes, although it is met with in the out-patient room. The patient is well nourished, and capable of considerable effort, mental and physical, *when she likes*, but develops a neuralgia, a headache, sickness, &c., when she has any disagreeable duty to perform or anything contrary to her desire. On inquiry all the functions will be found normal; perhaps leucorrhœa and a little dysmenorrhœa are complained of. There is frequently a family history of neurosis.

This class of case requires little beyond firm moral treatment and need not detain us here.

II. Hysteria with marked Malnutrition and Wasting. (*Neurasthenia*.)

These are cases in which some sudden mental shock, mental or physical strain, has started the symptoms; instances would be found in a disappointment in some love-affair, loss of a dear relation or of money, or prolonged nursing of the sick. No pelvic symptoms may arise, nor indeed are they usually present.

At first the patient may complain of weakness and debility, she does not feel capable of as much mental or bodily exertion as formerly; her accounts and servants worry her; she suffers from anorexia and loss of sleep, often taking soporifics to relieve the latter. Sympathising and injudicious friends make matters worse; she wastes more or less rapidly, and becomes the victim of "profound anæmia." Various nervous manifestations (neuroses) follow, such as paresis, vomiting, paralysis and the like, and she rapidly becomes a bedridden invalid. It is useless to tell her to walk, her wasted musculature precludes the possibility of it; her pains, aches and other sufferings are real, and are due to deficient blood-supply to her nervous system.

Treatment.—1. Ascertain that there is no organic disease present, such as nervous, cardiac, or pulmonary;

2. Isolate the patient from all her friends and relations, substituting a kind but strong-minded nurse who has the knack of managing such cases.

3. Produce muscular metabolism by massage and electricity, thus promoting the power of assimilation, for which large quantities of nutritious food should be administered;

4. The increase in weight must be taken every week; the duration of the treatment is about six weeks and the gain should be at least one stone. An increase of three stone has been observed.

5. If improvement is not noticed by the end of ten days, a discontinuance of the treatment is advisable.

III. Neuroses in which Pelvic Disease is present.

Cases may be met with in which—

(1) The pelvic disease is simply "associated" with the constitutional condition;

(2) The neuroses may be entirely dependent upon the pelvic condition.

The difficulty in diagnosis and treatment consists in making an accurate discrimination between these two varieties. To aid the reader to attain this object, two typical cases, one in each class will be related.

1. A girl of eighteen years of age, in consequence of a love-affair, studies hard at painting and prepares for an examination in that subject; up to that time she has been in perfect health, menstruating normally and painlessly: her family history is strongly "neurotic." After three months' work she breaks down, is unable to sleep or eat, and wastes somewhat; menorrhagia and dysmenorrhœa appear. Retching and vomiting after food become

continuous; mental depression, fits of crying, headaches and difficulties of vision follow.

On examination of the pelvis *per rectum*, a large, prolapsed, mobile and tender ovary on the left side is found: the pelvic disease, although associated with the neurotic condition in this case, was not its direct cause: no attention was paid to it, but all treatment concentrated upon the general condition; perfect recovery followed.

2. A married woman, aged twenty-one years, with one child, got up too soon after her confinement; she rapidly developed backache, menorrhagia, wasting and retching, with mental depression, especially at the menstrual epochs. A peculiar cough appeared which was always much worse when she was worried: a profuse leucorrhœa weakened her considerably.

On examination, a large retroverted and slightly prolapsed uterus was found, the sound passing 4 inches; the left ovary lay in Douglas's pouch. The cervix was deeply lacerated on the left side.

Treatment consisted in thoroughly scraping out the uterine cavity with a sharp flushing curette (p. 90) and the insertion of a Hodge's pessary. She made a rapid recovery and all her reflex symptoms, which were evidently due to the pelvic disease, disappeared.

Unfortunately a sharp line of division like the above cannot be made as a rule, the majority of cases lying on the border-line. There has certainly been until quite recently a tendency to an over-amount of local treatment, which has frequently only increased the general symptoms and tended to leave the patient a confirmed invalid.

It should be remembered in treating these cases that:

1. Uterine displacements in a large majority of cases, unless complicated with prolapse, rarely produce any symptoms in themselves. The same may be said of deep cervical lacerations.

2. There is no direct proportion between the amount of displacement and the severity of the nervous symptoms.

3. Removal of the ovaries usually fails to relieve the patient's condition.

4. Many of these women have marked neurotic family histories, and they themselves are not endued with very stable brains: the symptoms therefore are frequently more mental than physical, and should be treated accordingly.

IV. Perversion of sexual instinct—Nymphomania, and the like.

V. Hystero-epilepsy.

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CHAPTER XXI.

COCCYDYNIA—ACHING AND MOVABLE KIDNEY—STERILITY.

(a) By *coccydynia* we mean a painful state of the parts around the coccyx: pain, often very intense, is produced by the acts of sitting (especially rising from a seat), walking, defecation, and coition.

A somewhat similar condition may be associated with fissure of the anus, hæmorrhoids, perimetritis, ovaritis, vulval abscess, and separation of the bones at the symphysis pubis.

Causation.—1. Rheumatic inflammation of the ligaments about the coccyx or its periosteum;

2. Constitutional depression—neuralgia;

3. Congestion from chill;

4. Actual injury to the sacro-coccygeal joint as the result of labour.

Diagnosis should be made by one finger in the rectum, the fingers of the other hand over the skin surface of the coccyx.

Treatment.—1. If any pelvic disease is present, treat that condition;

2. Relieve any constitutional state by means of arsenic, quinine, or iodide of potash;

3. Local applications of belladonna and opium;

4. Operative measures—

(a) Separation of the attachments of the ligaments by a tenotomy knife;

(β) Incision of the inflamed periosteum;

(γ) Excision of the coccyx.

(b) *Aching Kidney.*—This term was applied by the late Dr. Matthews Duncan to a painful condition of one or both kidneys: pain referred to either kidney may frequently be observed as a symptom of other diseases (not renal) which are surgical in nature, and therefore not included here. Reference should be made to the Chapter on Development of the Pelvic Organs (p. 29), in order to understand the intimate relations which exist between the renal and genital organs.

Symptoms.—(1) The pain is persistent, dull, and boring in character, the patient referring it to the region of the lower ribs and in front (hypochondrium).

(2) It is usually associated with irritability of the bladder and often pain down the corresponding leg.

(3) At menstruation it is often increased in severity, producing one of the forms of spurious dysmenorrhœa; during pregnancy a certain immunity may be enjoyed.

(4) One or both kidneys may be affected, or the kidney may be displaced (floating kidney).

(5) Exercise may increase the pain; in a case observed by the author for some time, exertion, provided it was limited to simple walking, was rather productive of relief, but riding in a cab intensified the suffering.

(6) Albumen may be present in small quantities

Diagnosis should be made from—

- a. Calculus;
- b. Pyonephrosis;
- c. Tubercular kidney;
- d. Malignant disease.

Treatment must be tonic in nature, and anti-neuralgic. If the affected kidney is misplaced, a properly fitting belt gives great relief.

(c) **Movable Kidney** is much more common in women than in men, probably because of the facts that absorption of fat and the conditions of abdominal pressure are subject to greater variations. There is a distinct hereditary tendency either to this or to other displacements; thus, a mother with backward or downward uterine displacement, may have a daughter with mobile kidney or a child with prolapse of the rectum.

Loss of fat subsequent to childbirth, or as the result of a neurosis combined with a lax abdomen are very strong predisposing causes to this condition. The symptoms accompanying it are very variable. In some cases the patient is unaware of the organ being misplaced. In the majority of patients, however, some of the following arise: acute pain from kinking of the ureter; complete strangulation, the result of torsion of the renal vessels leading to a fatal result; a general neurasthenia. Should a prolapsed movable kidney become the subject of a hydronephrosis, a diagnosis from an ovarian cyst must be made.

(d) **Sterility.**—In considering this subject attention should be directed to the fact that the fault is laid much too frequently at the door of the female, and she is overtreated for a pathological condition which often does not exist, while the husband from some antecedent gonorrhœa or orchitis is the real delinquent.

Hence it is very important, in treating cases of sterility, to have an independent expert opinion on the health of the male before subjecting the female to needless local treatment. A patient may be "absolutely" or "relatively" sterile. In the former case there is absolute failure to conceive, while in the latter there is nothing but a series of miscarriages and premature births with stillborn children as the result of conception—a "falling short" of maternity. The causes of sterility may be divided in four groups:—

- (a) *Those preventing the secretion of a healthy sperm cell (male).*
It is certain that in many robust men, who perform the sexual act properly and with vigour, the semen contains no spermatozoa, and is hence sterile. Gonorrhœa and epididymitis before marriage lead to this condition.
- (β) *Those preventing the secretion of a healthy germ cell:*
 - 1. Congenital absence or ill-development of the ovaries.
 - 2. Perimetritic adhesions around the ovaries.
 - 3. Constitutional causes, such as obesity, chlorosis, kidney disease, the leading of a luxurious life.
 - 4. Marriage either before the age of twenty-three or after that of thirty-eight years. The age of "nubility" being from twenty to twenty-five.
- (γ) *Those interfering with the proper function of sperm and germ cells.* The former do not concern us here—among the latter may be included:
 - 1. Acute antelexion (p. 149).
 - 2. Conical cervix with pinhole os uteri externum; hypertrophic elongation of infra-vaginal cervix (p. 130).
 - 3. Atresia of any part of the genital tract whether congenital or acquired (p. 104).
 - 4. Conditions producing "spasmodic" dysmenorrhœa (p. 72).
 - 5. Vaginismus and the conditions leading to it (p. 111).
 - 6. Acid uterine discharges destroying the vitality of the sperm cell.
- (δ) *Lack of sexual affinity.*—This term is best defined by giving an example. A widow with children by her first husband marries a widower also with children by his first wife but no family results from their marriage, although the conditions present on both sides may be entirely favourable.

APPENDIX A.

PHYSICAL SIGNS OBSERVED DURING PREGNANCY.

(A) DURING THE EARLY MONTHS AND WHILE THE UTERUS IS STILL IN THE PELVIC CAVITY.

1. Mammary changes.
2. Uterine changes made out—

(a) *Per Vaginam* :

Slight sinking of the uterus in the pelvic cavity during first six weeks, probably owing to its increased weight ;
Anteversion of the fundus uteri ;
Progressive softening of the cervix uteri from below upwards ;
Violet staining of vaginal mucous membrane and cervix ;
leucorrhœa.

(b) *Bimanually* :

Evident uterine enlargement, especially in an antero-posterior direction ;
The lower segment is globular in shape and softish in texture ;
An obscure sense of fluctuation about the third month.

(c) *Per Rectum* :

The bulging of the posterior uterine wall is distinctly felt.

(B) AFTER THE RISING OF THE UTERINE TUMOUR OUT OF THE PELVIC CAVITY.

1. Mammary changes increased,
2. *Per Abdomen* :

About the tenth to twelfth week of pregnancy, the soft semi-elastic fundus can be detected above the symphysis pubis ;

At the fifth month the tumour is level with the umbilicus ;

At the seventh it is $2\frac{1}{2}$ inches above it ;

The growth of the swelling is gradual and regularly progressive as a rule.

On Inspection. Deposit of pigment is observed in the median line between the navel and symphysis pubis and around the former structure ; white lines appear as the stretching of the abdominal walls increases.

The umbilicus during the early months is depressed, while in the later months it becomes level or even protrudes.

On Palpation. Rhythmic uterine contractions with change in shape of the tumour, anterior bulging being noticed during extraction ;

Fœtal movements after the fourth month ;

Fœtal limbs, can be detected after the sixth month ;

On percussion the tumour gives a dull note ; the flanks are resonant.

On Auscultation. Fœtal heart sounds at the rate of from 130 to 140 per minute : these are absolutely indicative of pregnancy ; but may be present in an extra- as well as an intra-uterine foetation ;

Uterine souffle synchronous with maternal pulse ; it may be simulated by bruits in the large vessels of other uterine tumours ;

Umbilical souffle (occasionally), especially when the cord intervenes between the observer and the child's back.

3. *Per Vaginam :*

The cervix is higher up in the pelvis, until about fourteen days preceding labour ;

The staining is deepened ;

The softening of the cervix has progressed ("apparent" shortening) ;

During the last three weeks "real" shortening.

4. *Bimanually :*

Ballotement by external or internal method.

Exception—a large foetus with scanty liquor amnii.

APPENDIX B.

ON THE ADVISABILITY OF MAKING A LOCAL (VAGINAL) EXAMINATION.

Most patients suffering from uterine ailments are talkative, and very great care should be taken not to accept their statements unreservedly ; hence our chief reliance for making a diagnosis must rest on local examination. In considering the advisability of making a vaginal examination four classes of females come before us :

(1) Girls before puberty.

(2) Young unmarried women.

(3) Married multiparous or nulliparous women.

(4) Women (single or married) at or about the climacteric.

In (1) examination is rarely necessary, and then under three conditions only : (a) Vulvitis ; (β) Stone in the bladder ; (γ) Retarded puberty with development of serious pelvic symptoms.

(2) Young unmarried women should never be examined (except per rectum) unless general treatment has failed and there are very distinct indications of local disorder—*e.g.*, amenorrhœa from suspected atresia, severe dysmenorrhœa or menorrhagia. In metrorrhagia exploration is always advisable.

(3) Married women should always be examined if they complain of any pelvic symptoms, especially in cases of meno- and metrorrhagia.

(4) Any hæmorrhagic discharge in old women should be looked upon with grave suspicion and an examination insisted on.

Vaginal examination is usually contra-indicated during menstruation, but in certain cases it is desirable :—

(a) In cases of polypi which appear at the os uteri during menstruation and disappear in the intervals.

(β) When it is required to feel the cervix with the os uteri patulous, as is the case during menstruation.

If a patient is to be examined under an anæsthetic always have a third person present.

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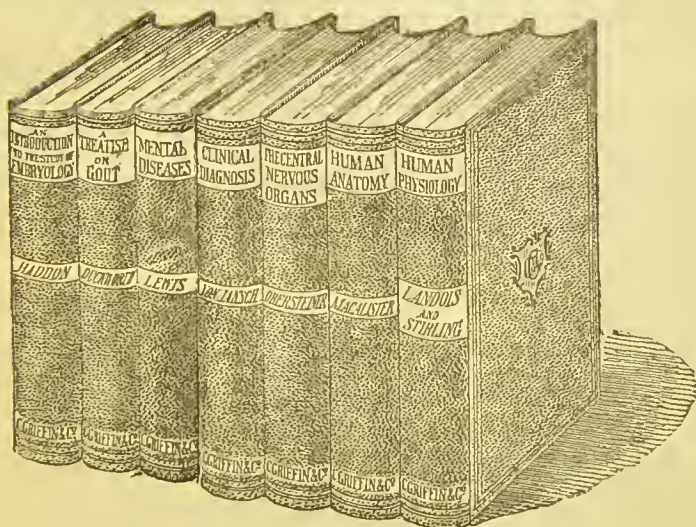


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